The British Columbia Forest Industry

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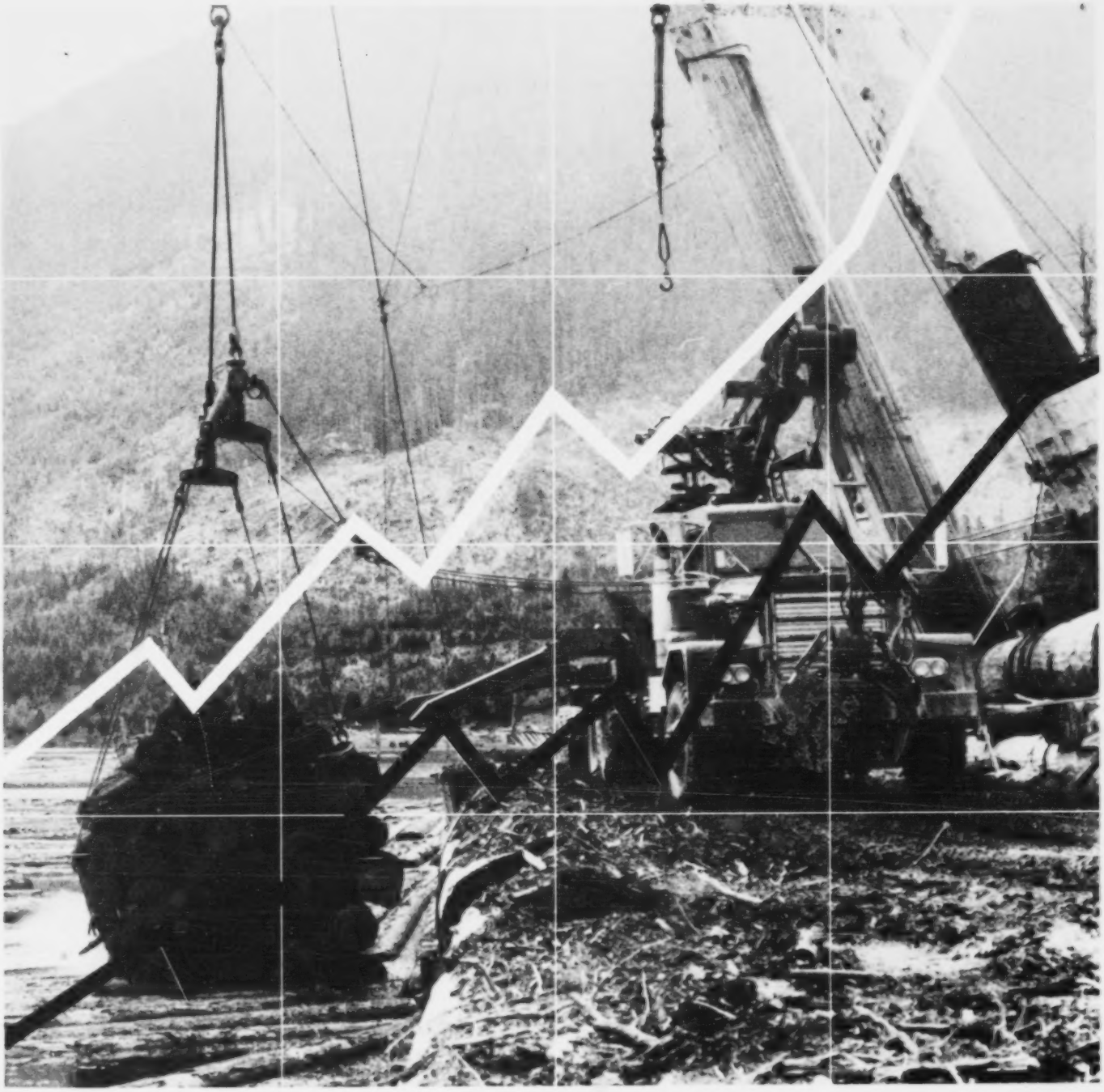
It's direct and indirect impact on the economy



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THE BRITISH COLUMBIA FOREST INDUSTRY

ITS DIRECT AND INDIRECT IMPACT ON THE ECONOMY

Prepared by
F.L.C. Reed and Associates Ltd.
1973

Department of Lands, Forests
and Water Resources

Honourable Robert A. Williams
Minister

J. S. Stokes
Deputy Minister
British Columbia Forest Service

FOREWORD

The following report was prepared for the Department of Lands, Forests, and Water Resources by a firm of consulting economists in order to determine the impact of British Columbia's forest industry on the provincial economy. The compilation of more than one hundred tables of detailed statistics relating to the forest economy is an invaluable by-product of the project.

Throughout the course of the study there was continued contact with several federal and provincial government departments and considerable assistance was supplied by the industry. I would like to add my appreciation, to that of the consultant's for the excellent co-operation provided by individuals representing these departments and firms and for their thoughtful reviews of various sections of the manuscript.

The report shows conclusively the important position which the industry occupies within the fabric of our province, particularly with respect to socio-economic development in the northern regions.

In view of the widespread interest in the study I am pleased to make the consultant's unaltered report available in its entirety for general distribution.

Robert Williams
Minister.

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SUMMARY OF THE REPORT

The principal objective of the study is to evaluate the direct and indirect impact of the forest sector on the British Columbia economy. Highlights from each chapter of the study are contained in the following summary.

I History and Current Structure of the British Columbia Forest Industry

1. The net selling value of shipments of the British Columbia forest industry was $1.8 billion in 1972.

2. The forest industry accounts for approximately 44 per cent of the value added by all goods producing industries in the province.

3. The Interior forest is gaining rapidly in importance, increasing from 24 per cent of the timber harvest in 1950 to 50 per cent in 1971.

4. British Columbia now harvests 45 per cent of all the roundwood cut in Canada, compared with 28 per cent in 1950.

II Annual Expenditures of the Forest Industry

1. Some of the major operating expenditures by the British Columbia forest industry in 1970 were as follows:

- roundwood	$ 880 million
- wages and salaries	621
- non-wood raw materials	92
- fuel and power	70

2. Annual capital and repair expenditures by the British Columbia forest sector averaged $444 million during the years 1969-71. Capital and repair spending in the wood, paper and allied industries over this period accounted for 63 per cent of the total investment in all manufacturing industries in British Columbia.

3. The forest industry is a very large user of transportation services. During 1970 close to 61 million tons of raw materials and supplies were moved to logging camps and conversion plants. Approximately 17.5 million tons of products were shipped from conversion plants.

4. Freight revenues generated by the forest industry in 1972 exceeded $400 million, just to Canadian contract carriers alone.

5. In 1970, the province's forest industry firms purchased operating supplies worth $ 365 million, as well as capital and repair goods worth $345 million. The origin of these goods was as follows:

British Columbia	$ 320 million
Other Canada	265
Imports	125
	$ 710

III Expenditures and Activities of the B.C. Forest Service

1. B.C. Forest Service expenditures grew from $4.9 million in fiscal 1950/51 to $43.8 million in fiscal 1970/71. Major expenditures in 1970/71 were fire suppression at $9.8 million, management, protection and overhead at $6.8 million, and reforestation at $3.7 million.

2. In 1971, continuously employed personnel in the B.C. Forest Service totalled 2,391. A further 5,513 were employed on a seasonal basis.

3. In the 10 years to 1971, Forest Service receipts exceeded expenditures by an average of $27 million annually. This represents a substantial contribution to the provincial treasury. No other Forest Service in Canada operates in the black.

IV Employment Impact of the Forest Industry

1. Research has shown that a local employment multiplier of 2 is common for small forest based communities. Employment multipliers in this study were found to be 2.43 at Prince George and 2.49 in the Okanagan.

2. Direct employment in the British Columbia forest industry was 74,600 in 1970. Indirect employment was conservatively estimated in the amount of 138,200. This implies a provincial multiplier of 2.8 or more. In effect, each job in the forest industry is related to 2 jobs in other industries.

3. Total employment in British Columbia was 810,000 in 1970. Multiplier analysis indicates that 225,000 of these employees owe their livelihood to the forest economy.

V Public Revenue from the British Columbia Forest Industry

1. Federal and provincial revenue from British Columbia forest industry firms and employees totalled $397 million in 1969. This is equivalent to $21.00 per cunit of timber harvested, an amount which will be exceeded in 1972.

2. Provincial taxes paid by the industry in 1969 amounted to $186 million. This is equivalent to $9.85 per cunit of timber.

3. Federal taxes of $104 million were also paid by forest industry firms.

4. Persons employed directly by the forest industry paid $30 million in income and sales taxes to the province, as well as $77 million to the federal government.

VI Foreign Trade in British Columbia Forest Products

1. British Columbia forest product exports, which account for close to two thirds of British Columbia's exports, were valued at $1.4 billion in 1971. Close to 45 per cent of Canadian forest product exports in 1971 originated in British Columbia.

2. The United States is by far the largest single market for British Columbia forest product exports. In 1971, the United States market accounted for 64 per cent of British Columbia forest product exports. The next largest market was the European Economic Community with 11 per cent.

VII Related Uses of Forest Land

1. Approximately 30,000 miles of system road is potentially usable by tourists in British Columbia, however, much of this is restricted to public access due to active logging.

2. The Kamloops and Cariboo Forest Districts contain the majority of the forest land in the province which is grazed. The direct contribution to the economy from grazing on Crown forest land was approximately $12 million in 1971.

INTRODUCTION

This study was commissioned by the British Columbia Forest Service in order to provide a better understanding of the British Columbia forest sector and its impact on the provincial economy. The principal objective of the study is to evaluate both the direct and indirect impact of the forest industry. Identifying direct forest industry income, employment, and revenues from timber sales is quite straightforward. However, much of the impact is indirect and is not readily quantifiable.

The study commences with a review of the historical background, national setting and current structure of the forest industry. The industry's capital and operating expenditures are reviewed in Chapter II. In addition, an analysis is made of transportation services used and of the origin of goods and services purchased by the industry.

In Chapter III B.C. Forest Service expenditures are analysed and a short description is presented of the agency's functions. The employment impact of the forest sector is dealt with in Chapter IV. Surveys were conducted in Prince George and the Okanagan regions to secure a better appreciation of the secondary effects of the forest industry on community employment. In addition, an estimate is made of total direct and indirect forest sector employment in British Columbia.

An analysis of public revenue generated directly and indirectly by forest sector activity is presented in Chapter V. Chapter VI discusses the dominant role of forest products in British Columbia's export trade. The concluding chapter deals with two other areas of interest, the recreational use of logging roads on Crown land and forest land grazing.

A comprehensive statistical manual has been prepared which supplements the data contained in this report. The manual presents a record of the British Columbia's forest industry and also provides data on other provinces for comparative purposes.

The analysis in the study is quite straightforward and does not rely on sophisticated techniques such as input-output analysis. Although the use of input-output data would have assisted in the analysis, the necessary data could not be developed within the budget or time available for the study. In cases where data was deficient and where judgment was exercised, an effort was made to adopt conservative estimates. The resulting picture of the forest industry's impact is therefore understated.

We gratefully acknowledge the cooperation of the British Columbia Forest Service, the Bureau of Economics and Statistics and other organizations, both public and private, which supplied advice and information. Valuable assistance was provided by Mr. D. McLean, forest economist for the British Columbia Forest Service, who prepared material on the expenditures and activities of the B.C. Forest Service, trade, recreational use of Crown land and grazing. A special note of appreciation should also be given to Mr. N. Hartgerink and Mr. T. Laanemae of Statistics Canada for their assistance in the preparation of special compilations.

The study team included D.G. Fletcher, W.J.B. Palmer and F.L.C. Reed.

CHAPTER I

HISTORY AND CURRENT STRUCTURE OF THE BRITISH COLUMBIA FOREST INDUSTRY

A. Historical Background

The first recorded commercial use made of British Columbia's forests dates to 1788 when the fur laden ship of Captain John Meares took on a deck cargo of spars and sailed for China. As settlement progressed, pit sawyers converted logs to lumber for the construction of Hudson's Bay Company forts. When in 1845 that company transferred its headquarters from Fort Vancouver on the Columbia River to Victoria, the history of commercial sawmilling in British Columbia commenced. A machine-operated, water-powered sawmill was built at Mill Stream on Esquimalt Harbour and the first lumber was sawn on November 24, 1848.

The forest industry grew from this small beginning to become the most important sector in the British Columbia economy. In terms of value added, forestry has led the primary industries since 1943 while, except during the war years, sawmilling (saw and planing mills) has been the number one manufacturing industry since the 1920's.

Although a small mill producing pulp from imported rags operated near Alberni from 1894 to 1896, the pulp and paper industry had its real beginnings about 1910. In the period from 1909 to 1912, one groundwood mill, one newsprint mill, and three chemical pulp mills were built along the south coast. Three more pulp mills were built between 1917 and 1923 but by 1926 two of the eight original mills had been abandoned.

Little progress was experienced in the pulp and paper industry from the 1920's until after World War II when one sulphite and two sulphate pulp mills were built along the coast and several existing mills underwent expansion and modernization. A major pulp industry boom occurred during the fifties and first half of the sixties. In those years seven sulphate pulp mills and one sulphite mill were established, including the first mill in the Interior Region. In this period, further expansion and modernization programs were also carried out at existing mills. Since 1965 seven more sulphate mills have been built. The pulp and paper industry has become solidly established in second place amongst the manufacturing industries of the province.

British Columbia timber harvest records extend back to 1912 when log production was 238 million cubic feet. By the late 1920's log production had risen to 500 million cubic feet, only to fall back during the Depression before recovering to over 600 million cubic feet immediately prior to 1939. The timber harvest dropped again during the war years but soared to over 1,000 million cubic feet by 1955. Chart 1 shows the British Columbia timber scale from 1945 to 1971 and illustrates the increasingly important role played by the Interior industry from 1950 onward.

About 95 per cent of British Columbia's 134 million acres of forest land is owned by the province. Federal parks and other federal lands cover 1 per cent and the remaining 4 per cent is privately owned, having been alienated under Crown grant.

Timber harvest by forest land status is shown in Chart 2. The relatively constant harvest from private forest land reflects a state of exploitation to sustained yield potential and the increases in timber harvest have been drawn almost entirely from provincial forests. Generally speaking, given the current standards of utilization and rotation ages, the south Coastal and the south Interior forests (lands south of the 52nd parallel) are on balance being depleted at a level which is rapidly approaching the presently calculated allowable annual cut. However, the forests of the central and northern Interior could sustain an annual harvest of well over three times their present cut or an additional volume totalling about 50 per cent of the entire provincial harvest in 1970.

About 75 per cent of the British Columbia timber harvest is converted into lumber by sawmills within the province. This share has remained fairly constant over the last decade. During the same period pulp production has more than doubled while the portion of the timber harvest going to pulpmills as roundwood has declined. Most of the increased wood requirement of pulp mills has been delivered as pulp chips produced from wood residues in British Columbia sawmills. Further pulp chip volumes are produced from veneer and plywood mill residues. In addition to pulp, particle board and hardboard industries utilize a small volume of wood residue.

Chart 1

British Columbia
Timber Harvest

(Millions of Cubic Feet)

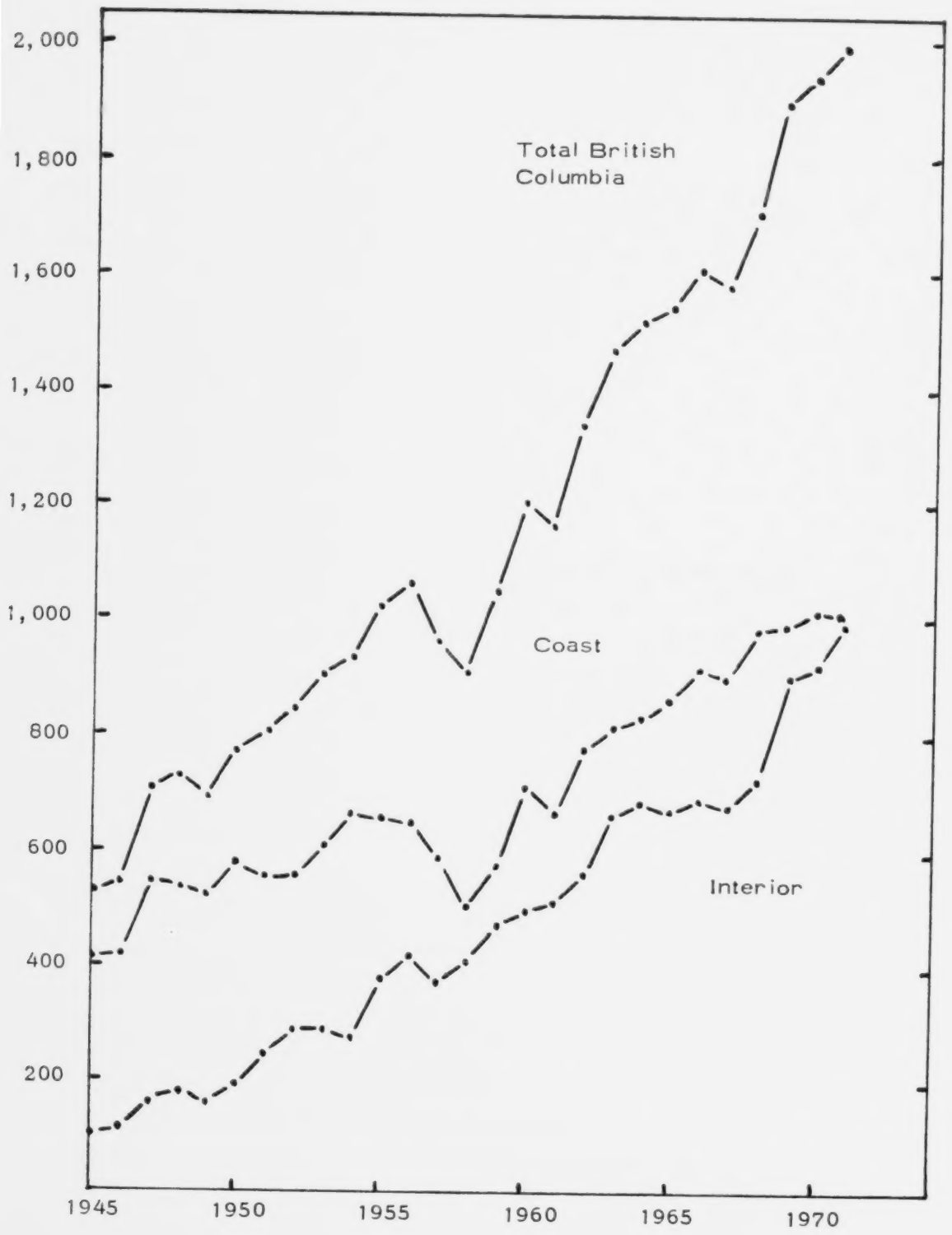


Chart 2

British Columbia
Timber Harvest From Provincial
and Private Forest Lands

(Millions of Cubic Feet)

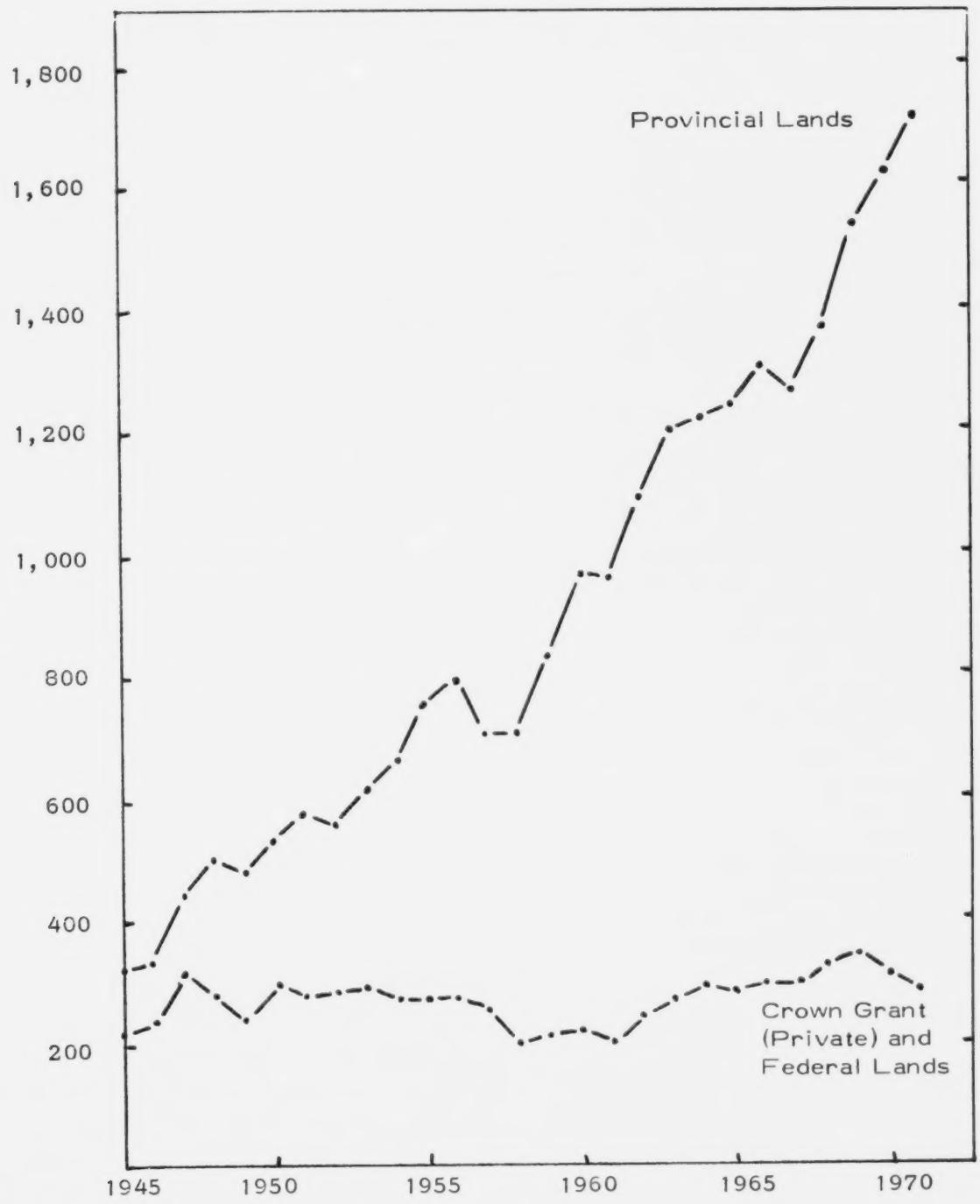


Table 1

British Columbia
Industrial Roundwood End Use

(Millions of Cubic Feet)

	1963		1971	
	Volume	Per Cent	Volume	Per Cent
Sawmills	1,090	74	1,537	77
Pulp Mills	215	15	260	13
Veneer and Plywood Mills	96	7	120	6
Shingle Mills	37	2	40	2
Minor Products	22	1	20	1
Log Export	10	1	20	1
Unaccounted for	3	-	-	-
Total	1,473	100	1,997	100
Wood residues	220		395	

Source: Bureau of Economics & Statistics, Victoria, B.C.

B. Current Structure of the Industry

The wood industries form the most important industrial group in the British Columbia economy while sawmills and planing mills constitute the province's leading manufacturing industry. The combined value of output from logging and the forest based manufacturing industries accounts for about 44 per cent of total value added by all primary and manufacturing industries within the province. When those engaged in government forestry services are added to the 1970 employment figures given in Table 2, total forestry employment comes to approximately 77,000 or 10 per cent of the employed labour force in British Columbia.

In terms of total forest industry employment by sector, sawmills and planing mills lead with 33 per cent, followed by logging at 25 per cent and pulp and paper mills with 17 per cent. The other 25 per cent is accounted for by plywood and veneer plants and by miscellaneous wood and paper using industries.

Table 2

British Columbia
Net Value of Output and Total Employment
in the Forest Industry

Industry Sector	Value Added in Millions of Dollars 1969	1970	Number Employed 1969	1970
Logging	392 a)	334 a)	20,710	18,975
Sawmills and Planing Mills	358	264	26,388	26,983
Veneer and Plywood Mills	92	67	7,477	6,986
Other Wood Industries	55	51	5,634	4,518
Total Wood Industries	505	382	39,499	38,487
Pulp and Paper Mills	296	322	13,568	14,831
Other Paper and Allied	32	35	3,744	2,258
Total Paper and Allied Industries	329	357	17,312	17,089
Total Forest Industry	1,226	1,073	77,521	74,551

a) Excludes stumpage and royalty paid.

Source: Statistics Canada

Data are included in Table 2 for both 1970 and 1969. The year 1970 is the latest one for which complete data are available but 1969 is a more representative year. Production of all major products declined during 1970 in response to reduced demand and lower prices for lumber and plywood in the key United States and Canadian markets and a general over-supply situation in export pulp and newsprint markets. A reasonable degree of recovery in wood product markets occurred during 1971 while a marked increase in North American housing starts during 1972 pushed lumber and plywood prices to record highs. Pulp and paper markets also strengthened during 1972 and it is expected that the total net value of 1972 forest industry output will surpass the 1969 level and exceed 1970 by a substantial margin.

British Columbia produces about 70 per cent of Canadian lumber. Virtually all British Columbia lumber is softwood and, on the average, about 75 per cent is exported. The Coastal sawmills, shipping mainly by water to the United States Atlantic seaboard, the United Kingdom and Europe, dominated the sawmilling industry until after World War II. Since 1950 there has been a rapid expansion of lumbering into the Interior forests. Railroad extensions during the 1950's coupled with the American post-war housing boom provided profitable outlets for Interior lumber production. The Interior sawmill industry now surpasses the Coast in production volume. Post-war lumber production is shown in Chart 3.

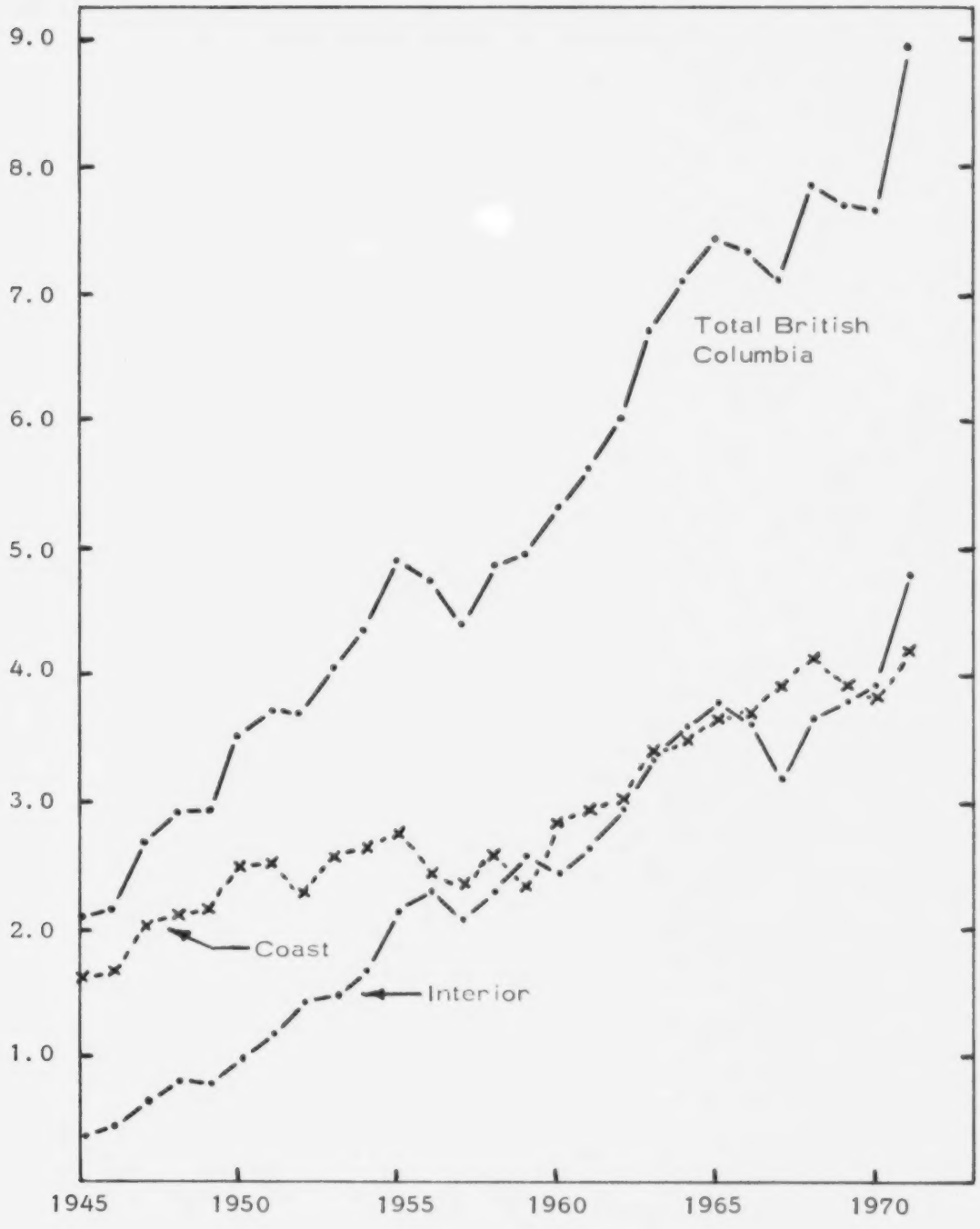
The veneer and plywood industry, founded on coastal Douglas fir, grew from nine establishments with a shipments value of $12 million in 1945 to 28 establishments which shipped products valued at $207 million in 1969 and $176 million in 1970. Veneer and plywood followed lumbering into the Interior where, in addition to Douglas fir, spruce, pine and balsam are peeled for sheathing grade construction plywood. British Columbia now accounts for 90 per cent of Canadian softwood plywood production, about 75 per cent of which is consumed domestically. Shipments of softwood plywood into the United States are effectively blocked by a 20 per cent tariff.

From a small beginning around 1950, the production of sulphate or kraft pulp rose steadily to surpass combined groundwood and sulphite production in 1962, then rapidly increased to over 3 million tons by 1969. Market softness in 1970 caused reduced production but a strengthening of markets in 1971/72 has resulted in recovery

Chart 3

British Columbia
Lumber Production

(Billions of Board Feet)



and 1972 kraft pulp production is expected to exceed the 1969 record. Over 80 per cent of kraft pulp is exported from Canada. Groundwood pulp is used primarily in the production of newsprint although some is consumed in the manufacture of tissues and sanitary papers. Two mills produce dissolving sulphite pulp for the market while one produces a small amount of sulphite pulp for internal use in the manufacture of paper. A range of kraft wrapping paper, sack kraft, linerboard, corrugating medium, and roofing papers plus a line of fine papers and miscellaneous papers are manufactured in the province. About 99 per cent of newsprint production and 34 per cent of other paper and board is exported. In 1970 the pulp and paper mills shipped products valued at over $652 million compared to a 1945 total of $35 million.

The accompanying Chart 3 shows the growth of Coast and Interior lumber output since 1945. Chart 4 shows the progress of pulp and paper production, also from 1945.

Comparative statistics showing the increase in production of logs and major manufactured forest products between the years 1950 and 1971 are given in Table 3.

Table 3

Comparative Statistics for the
British Columbia Forest Industry

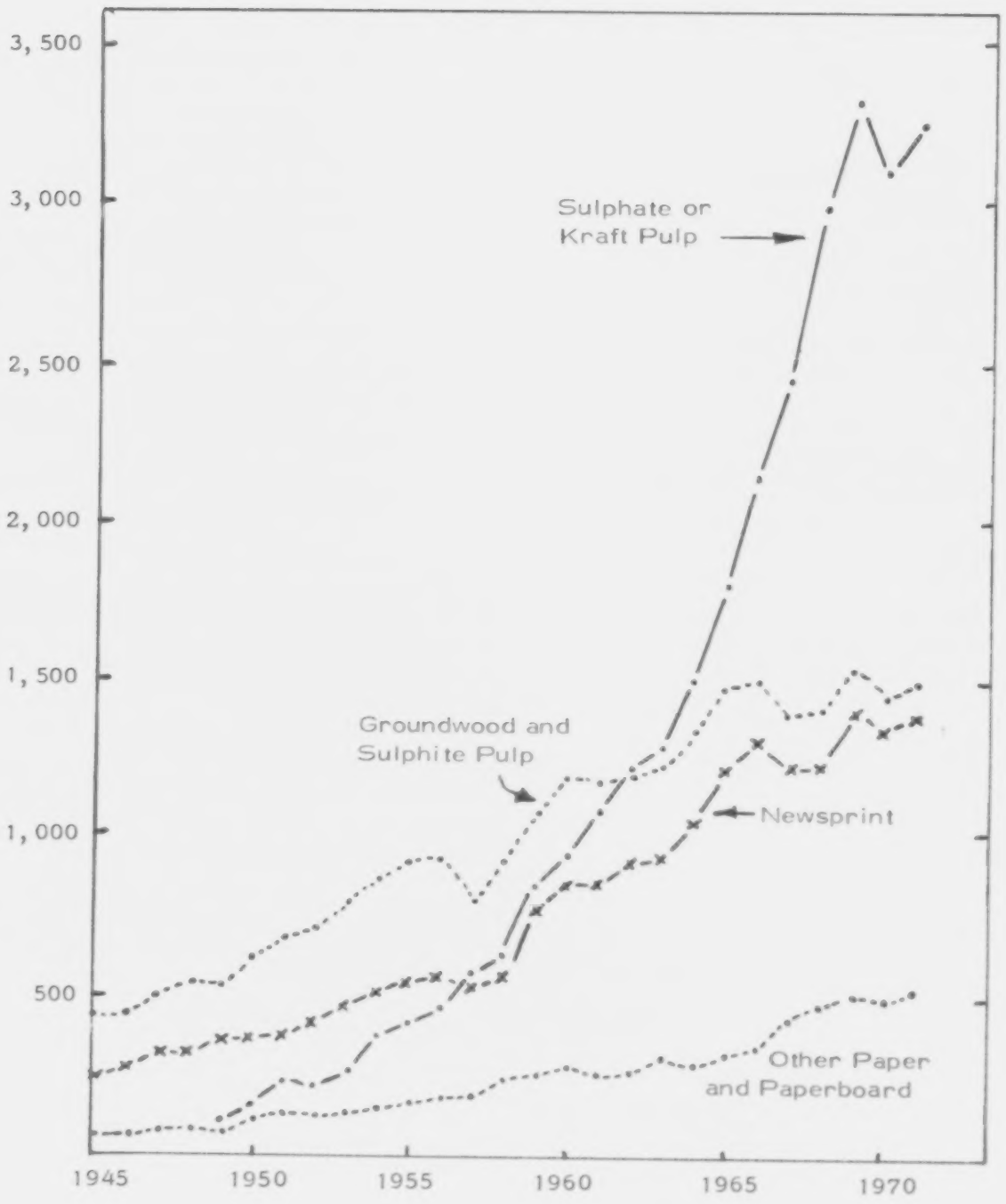
Product	Units	1950	1971	Per Cent Increase
Logs scaled	million cubic feet	776	1,997	157
Lumber	million board feet	3,509	8,970	156
Plywood	million sq. ft. 3/8"	292	1,874	542
Kraft pulp	thousand tons	159	3,277	1,961
Other pulp	thousand tons	618	1,494	142
Newsprint paper	thousand tons	383	1,394	264
Other paper and board	thousand tons	116	522	350

Source: Bureau of Economics & Statistics, Victoria

Chart 4

British Columbia
Pulp and Paper Production

(Thousands of Tons)



The Wood-Using Industries, other than sawmills and plywood plants, shipped products valued at $114 million in 1970. The selling value of shipments for members of this group of industries is shown in Table 4.

Table 4

British Columbia
Selling Value of Shipments
from Wood-Using Industries
1970

(Millions of Dollars)

Sash, Door and Other Millwork Plants	53.4
Shingle Mills	30.9
Wooden Box Factories	3.6
Coffin and Casket Industry)	
Miscellaneous Wood Industries)	25.9 *
	113.8

* Estimated

Source: Statistics Canada and
F.L.C. Reed and Associates Ltd.

Shipments from the Paper-Using Industries in 1970 were valued at $75 million. Table 5 presents the selling value of shipments for members of this group.

Table 5

British Columbia
Selling Value of Shipments
from Paper-Using Industries
1970

(Millions of Dollars)

Asphalt Roofing Manufacturers) Folding Carton and Set-Up Box Manufacturers) Corrugated Box Manufacturers)	49.9 *
Paper and Plastic Bag Manufacturers	18.6
Miscellaneous Paper Converters	6.7
	75.2

* Estimated

Source: Statistics Canada and
F.L.C. Reed and Associates Ltd.

C. Total Value of Shipments

The preceding paragraphs contain a number of measures, both volume and value, of the British Columbia forest industry. A single figure has not been given for the total value of shipments, the reason being that no such figure is published. A summation of the selling value of shipments of each branch of the industry would overstate the true value because the output of one sector may become the input of another. Serious double counting would result by this method.

A second approach is to take "value added" for each sector, but when this is done the result clearly understates the size of the industry. Value added can be defined approximately as the selling value of shipments, minus the cost of manufacturing materials and supplies, minus the cost of fuel and electricity consumed, plus or minus inventory adjustment. While this eliminates double counting, it ignores important elements of cost which must be recovered from sales revenue.

Table 6 shows that value added and gross selling value differ markedly. A difference of about $700 million persists even when logging is deducted and selling values are taken for manufacturing alone.

Table 6

Value Added vs Selling Value of Shipments
British Columbia Forest Industry
1970

(Millions of Dollars)

	Value Added	Selling Value of Shipments
Logging	334	884
Sawmills and Planing Mills	264	744
Shingle Mills	13	31
Veneer and Plywood Mills	67	176
Other Wood-Using Industries	38	83
	382	1,034
Pulp and Paper Mills	322	652
Other Paper-Using Industries	35	76
	357	728
	1,073	2,646

Source: Statistics Canada

A third method is to calculate a net selling value by adjusting for inter-plant transfers of lumber, chips, paper, etc. and by adding shipments of crude products such as log exports. This can be checked readily by placing a value on individual commodities, using available information on volume together with average prices.

A compromise figure is calculated in Table 7, which takes the 1970 selling values reported by the main commodity producing sectors and adjusts for crude products and for inter-plant shipments. If secondary wood and paper-using plants were considered as well, the net selling value of shipments would have exceeded $1,500 million in 1970.

Table 7

Approximate Net Selling Value of Shipments
British Columbia Forest Industry
1970

(Millions of Dollars)

Sawmills and Planing Mills	744
Shingle Mills	31
Veneer and Plywood Mills	176
Pulp and Paper Mills	652
Primary Manufacturing	1,603
Add: Poles, piling, log exports, Christmas trees and other crude products	50
Deduct: Inter-plant transfers of lumber, chips, pulp and other primary products	200
	1,453

Source: Based on Statistics Canada reports.

It should be noted again that the year 1970 was below the trend. A similar calculation for 1972 would result in a net selling value of approximately $1,800 million.

STIKINE
PEACE RIVER-
LIARD
NORTHERN INTERIOR
KITIMAT-STIKINE
BULKLEY-
NECHAKO
FRASER-FORT GEORGE
SKEENA
COAST
CARIBOO
SOUTHERN INTERIOR
OCEAN FALLS
COLUMBIA-
SHUSWAP
THOMPSON
CENTRAL
OKANAGAN
OKANAGAN-
SIMILKAMEEN
CENTRAL
KOOTENAY
EAST KOOTENAY
ROCKY MOUNTAIN
FOR DETAIL OF THIS
AREA SEE REVERSE SIDE
British Columbia
Economic Regions
REGIONAL DISTRICTS
Legend
Regional District Boundaries
Incorporated Municipalities
NOTE — Stikine: It is not proposed to incorporate this area as a regional district at this time.
December 1970.

D. Regional Distribution and Importance of the Industry

For the purposes of this study the forest districts within British Columbia have been combined to form three major economic regions which correspond closely to groups of regional districts. The Coast Region is comprised of the Vancouver Forest District and the coastal portion of the Prince Rupert Forest District and is divided from the two Interior regions by the Coast mountain range. The Northern Interior Region consists of the Interior portion of the Prince Rupert Forest District and the entire Prince George Forest District and is generally all of the Interior situated north of the 53rd parallel. The Southern Interior Region includes the Cariboo, Kamloops, and Nelson Forest Districts and covers an area roughly equivalent to the southern one-third of British Columbia's Interior.

These economic regions and the regional district boundaries are shown in the accompanying map while Table 8 sets out in percentage shares the forest resource, production, and employment on this regional basis.

Table 8

British Columbia
Regional Distribution of the Forest Industry
1970

(Per Cent)

	Coast	Northern Interior	Southern Interior
Total Area	18	56	26
Area of Mature Forest	22	50	28
Area of Immature Forest	8	55	37
Other Forest Land	10	68	22
Volume of Mature Softwood	44	36	20
Volume of Mature Hardwood	11	83	6
Net Annual Growth of Immature Wood	20	47	33
Allowable Annual Cut	38	37	25
Roundwood Produced	53	25	22
Lumber Produced	49	26	25
Plywood Produced	78	9	13
Pulp Produced	79	12	9
Forest Industry Employment	66	15	18

Source: Appendix Tables

The forest industry developed first in the Coast Region. In recent years, however, the importance of the Interior has grown rapidly. Roundwood production in the Interior increased from 24 per cent of the total provincial cut in 1950 to 47 per cent in 1970. The highest rate of growth is found in the Northern Interior where the share of provincial roundwood production rose from 10 per cent in 1950 to 25 per cent in 1970.

Recent sawmill expansion has been mainly concentrated in the Interior Regions where lumber production has increased from 28 per cent of the provincial total in 1950 to 51 per cent in 1970. The first pulp mill in the Interior came on stream in 1961. Since that year the pulp industry in the Interior has grown in importance and by 1970 accounted for one-fifth of the province's pulp production.

The Northern Interior now holds the greatest potential for growth in both wood and wood fiber products.

E. National Setting

British Columbia has 23 per cent of Canada's productive forest land, 53 per cent of all mature merchantable timber, and 61 per cent of mature merchantable softwood timber. A recent estimate of the potential economic allowable annual cut of softwood timber in all provinces shows the forests of British Columbia contributing about 47 per cent of the Canadian total. A British Columbia harvest of this size would be more than 1,000 million cubic feet (or 50 per cent) larger than the 1971 harvest.

As shown in Table 9, British Columbia leads all Canadian provinces in timber harvested and in the production of lumber, plywood and sulphate wood pulp. By virtue of her domination of the logging and wood products industries, British Columbia contributes more to the value added of Canadian forest industry production than any other province. In 1969, British Columbia accounted for only 29 per cent of Canadian forest industry employment but 35 per cent of industry value added. In terms of value added per employee, British Columbia led all other provinces in all three major industry categories. In 1969 the British Columbia industry achieved a value added per employee of $16,200, compared to $11,900 in Ontario and $11,300 in Quebec.

Table 9

Value Added and Employment by Province
The Canadian Forest Industry
1969

	British Columbia	Quebec	Ontario	Other Provinces	Total Canada
			(Millions of Dollars)		
Value Added					
Logging	392	167	113	75	747
Wood Industries	505	173	165	121	964
Pulp, Paper and Allied	329	586	614	219	1,748
Total	1,226	926	892	415	3,459
			(Thousands)		
Employment					
Logging	21	16	10	9	56
Wood Industries	40	22	19	13	94
Pulp, Paper and Allied	17	44	46	15	122
Total	78	82	75	37	272

Source: Statistics Canada

When value added is compared to the volume of roundwood produced, it is found that Ontario leads with about $143 per cunit followed by Quebec at $87 while British Columbia recorded only $65 per cunit. This situation reflects the dominance of the pulp and paper industry in the eastern provinces as well as a far greater proportion of secondary to primary industry.

British Columbia in 1969 harvested about 44 per cent of Canada's roundwood but contributed only 31 per cent to the value added by the manufacturing sector of the Canadian forest industry. The corresponding figures for Ontario are 14 and 29 per cent. Ontario pulp and paper mills converted over 80 per cent of their pulp production into paper and paperboard within the province while the majority of British Columbia's pulp production was sold on world markets.

CHAPTER II

ANNUAL EXPENDITURES OF THE FOREST INDUSTRY

In this chapter an analysis is made of major expenditures by the British Columbia Forest Industry in 1970. Industry operating and capital expenditures are presented in the first two sections. This is followed by an analysis of transportation services used by the industry. In the concluding section the origin of goods purchased by the industry is analysed in order to determine the share produced in British Columbia.

A. Operating Expenditures by Industry

The distribution of forest industry expenditures in 1970 is presented in Table 1. The data were obtained from special Statistics Canada compilations prepared for this study. Because some of the industries identified purchase products from one another, there is some unavoidable double counting in the table. This occurs in the totals shown for raw materials, containers and packaging, and selling value of shipments.

The values shown in the column entitled 'not identified' are the difference between the identified expenditures and the selling value of shipments. This includes items such as non-operating overhead, prepaid freight, depreciation and profit. The net taxable income of the British Columbia forest industry in 1970 has been estimated at $72.7 million, which is an indication of the profit included in the 'not identified' column.

Logging Industry:

Shipments from the logging industry were valued at $883.9 million. Major industry expenditures included $478.2 million for wood, followed by wages and salaries totalling $165.4 million. Wages and salaries represented approximately 20 per cent of the selling value of shipments.

The industry consumed over 9.4 million gallons of gasoline and 36.2 million gallons of fuel oil. Expenditures on fuel and electricity totalled $11.0 million. Operating and maintenance supplies were $59.2 million.

Table 1

British Columbia

Estimated Distribution of Forest Industry Expenditures in Relation to Selling Value of Shipments

1970

(Thousands of Dollars)

	Raw Materials		Wages & Salaries	Fuel & Electricity	Operating & Maintenance Supplies	Containers & Packaging	Office Supplies	Not * Identified	Selling Value of Shipments
	Wood	Non-Wood							
Logging Industry	478,206	-	165,353	10,988	59,160	-	635	169,553	883,895
Sawmills and Planing Mills	414,379	855	206,964	13,239	41,345	2,407	1,119	63,713	744,021
Shingle Mills	16,065	50	10,984	324	895	396	29	2,192	30,935
Veneer and Plywood Mills	85,437	7,592	53,346	3,574	9,288	889	245	15,347	175,718
Sash, Door and Other Millwork Plants	17,586	11,867	14,212	466	432	230	157	8,416	53,366
Wooden Box Factories	(	(	(	(	(	(	(	(	3,601
Coffin and Casket Industry	(12,170	(3,004	(8,190	(496	(633	(116	(77	(4,851	(25,936
Miscellaneous Wood Industries	(	(	(	(	(	(	(	(	(
Total Wood Industries	545,637	23,368	293,696	18,099	52,593	4,038	1,627	94,519	1,033,577
Pulp and Paper Industry	174,133	59,256	144,609	40,251	44,685	7,042	1,552	180,955	652,483
Asphalt Roofing Manufacturers	(	(	(	(	(	(	(	(	(
Folding Carton and	(	(	(	(	(	(	(	(	(
Set-up Box Manufacturers	(25,740	(8,130	(15,193	(514	(994	(1,031	(173	(16,767	(49,983
Corrugated Box Manufacturers	(	(	(	(	(	(	(	(	(
Paper and Plastic Bag Manufacturers	(	(	(	(	(	(	(	(	18,559
Miscellaneous Paper Converters	2,634	1,297	1,977	23	36	157	10	551	6,685
Total Paper and Allied Industries	202,507	68,683	161,779	40,788	45,715	8,230	1,735	198,273	727,710
Total Forest Industry	1,226,350	92,051	620,828	69,875	157,468	12,268	3,997	462,345	2,645,182

* Includes non-operating overhead, prepaid freight, depreciation, profit and other items.

Source: Compiled from unpublished Statistics Canada data.

Sawmills and Planing Mills:

The value of sales was $744.0 million which represented 70 per cent of the selling value of all shipments from the wood industries and 42 per cent of total manufactured products.

Major expenditures were $415.2 million for raw materials, followed by wages and salaries of $207.0 million. The combined cost of these two major expenditures was close to 85 per cent of the selling value of shipments. Operating and maintenance supplies accounted for $41.3 million. The cost of fuel and electricity totalled $5.6 million and $7.6 million respectively.

Shingle Mills:

Sales were valued at $30.9 million and represented only 3 per cent of sales from the wood industries. Raw material expenditures were $16.1 million followed by a payroll of $11.0 million. These two expenditures accounted for 88 per cent of the selling value of shipments.

Veneer and Plywood Mills:

Sales of $175.7 million were the second largest in the wood industries group. Wood and wood product costs totalled $85.4 million and expenditures on non-wood raw materials were $7.6 million. The major non-wood raw material was glue valued at $5.2 million. Wages and salaries totalled $53.3 million or 30 per cent of sales. The combination of raw materials and payroll accounted for 83 per cent of the value of shipments. The only other sizable expenditure was $9.3 million for operating and maintenance supplies.

Sash, Door, and Other Millwork Plants:

The selling value of shipments was $53.4 million. Raw material expenditures totalled $29.5 million of which 60 per cent was wood or wood based material. Wages and salaries accounted for $14.2 million and together with raw materials represented 82 per cent of the selling value of shipments.

Other Wood Industries:

This sub-group includes wooden box factories, the coffin and casket industry, and the miscellaneous wood industries. Sales totalled $29.5 million or 3 per cent of total sales in the wood industries. Raw material expenditures were $15.2 million and payroll was $8.2 million.

Pulp and Paper Industry:

Pulp and paper sales were $652.5 million in 1970. These shipments accounted for 90 per cent of sales in the paper and allied industries group and 37 per cent of total manufactured products.

The major expenditure in this industry was for wood and wood residue. The industry consumed 3.1 million cunits of pulpwood valued at $78.5 million and 3.7 million cunits of wood residue valued at $80.4 million. Wages and salaries of $144.6 million were the second largest items of expense and, together with total raw materials, represented 85 per cent of the value of shipments.

Expenditures on chemicals amounted to $59.3 million. The major chemicals consumed were 228,000 tons of caustic soda valued at $11.9 million, 213,000 tons of chlorine at $11.3 million, 41,000 tons of sodium chlorate at $5.0 million and 131,000 tons of saltcake at $4.4 million.

The industry consumed in excess of 3.2 billion kwh of electricity valued at $17.4 million. Fuel purchases included 166.3 million gallons of fuel oil valued at $13.1 million, and 16.8 billion cubic feet of natural gas at $7.0 million.

Operating and maintenance supplies were $44.7 million of which $7.4 million was expended on felts and wires. Container and packaging expenditures were $7.0 million.

Other Paper and Allied Industries:

This industry sub-group includes asphalt roofing, folding carton, set-up box, and corrugated box manufacturers as well as miscellaneous paper converters. Sales totalled $75.2 million. The largest expenditure was $37.8 million on raw materials followed by wages and salaries of $17.2 million. These two items accounted for 77 per cent of the total value of sales.

B. Capital and Repair Expenditures

Capital and repair expenditures in the British Columbia forest industry are presented in an annual survey conducted jointly by Statistics Canada and the federal Department of Industry, Trade and Commerce. Data on the forest industry is classified by wood industries, paper and allied industries, and forestry (logging).

Table 2

British Columbia Forest Industry
Capital and Repair Expenditures
Yearly Average for 1969/71

(Millions of Dollars)

	Logging	Wood Industries	Paper and Allied Industries	Total
Capital				
Construction	36.8	26.0	44.3	107.1
Machinery and Equipment	28.4	63.4	88.7	180.5
	65.2	89.4	133.0	287.6
Repair				
Construction	7.8	5.3	4.0	17.1
Machinery and Equipment	33.2	46.5	59.3	139.0
	41.0	51.8	63.3	156.1
Capital and Repair				
Construction	44.6	31.3	48.3	124.2
Machinery and Equipment	61.6	109.9	148.0	319.5
	106.2	141.2	196.3	443.7

Source: Statistics Canada

Investment in the forest industry from 1960 to 1970 was in excess of $3.2 billion. Over this period, capital and repair expenditures totalled $1,584 million for paper and allied industries, $843 million for wood industries, and $834 million for logging.

Capital and repair expenditures for the years 1950 to 1972 are presented in Chart 1. This shows the highly variable nature of expenditures in the paper and allied industries. In the 1950's, annual spending rose to a high of $118.7 million in 1957 and immediately declined. During the first half of the sixties, annual expenditures again increased at a rapid rate and peaked at $280.0 million in 1966. Following 1966, spending was once again reduced and reached a low of $135.1 million in 1968. In contrast, expenditures in the wood industries were relatively stable during the fifties with an average annual expenditure of $35.5 million. During the sixties, expenditures rose sharply, reaching $134.4 million in 1969.

A three-year average of capital and repair expenditures over the years 1969/71 is presented in Table 2. The average annual expenditure for these years was approximately $444 million. This figure is roughly equivalent to the investment required for the construction of five large pulp mills each year. Capital and repair spending in the wood, paper and allied industries over this period accounted for 63 per cent of total investment in all manufacturing industries in British Columbia.

C. Transportation Services Used by the Forest Industry

This section deals with freight hauled to and from the mills in the province, the mode of transport, and freight revenues generated by the forest industry. Most of the statistical information covering volumes and mode of transport was provided by Statistics Canada. This was supplemented by qualitative information obtained from officials in forest industry firms and in provincial government departments. One recurring difficulty throughout this section is that much of the material used by the forest industry is handled several times, which presents problems of measurement.

The forest industry is a very large user of transportation services. During 1970 almost 61.4 million tons of wood raw materials and non-wood supplies and equipment were transported to mills in the province and 17.5 million tons of products were moved from the mills. Some of the wood is moved twice, first as roundwood to sawmills and then as chips and hogged fuel to pulp mills. When allowance is made

Chart 1

British Columbia
Capital and Repair Expenditures

(Millions of Dollars)

for this duplication, it is found that for every ton of output some 3.5 tons of raw materials and supplies have to be moved to the logging camps and conversion plants. These findings are developed in the following paragraphs.

Freight Inbound to Logging Camps and Mills:

By far the largest inbound freight tonnage is roundwood. The total weight of roundwood produced in British Columbia in 1970 has been estimated at 50.5 million tons. Some 1.2 million tons of logs and pulpwood were exported leaving 49.3 million tons to be transported to conversion plants in the province. The estimates of weight are derived by converting the reported 1970 timber harvest of 1,933 million cubic feet and allowing for the species mix and region of felling.

The second largest tonnage moved is pulp chips produced from sawmill and plywood plant residues. It is estimated that 0.8 million tons of the 9.3 million tons produced were exported. The remaining 8.5 million tons were moved to pulpmills in British Columbia. Other wood materials moved to pulpmills total an estimated 1.0 million tons. This consists of sawdust and hogged fuel. Some sawdust is used in the manufacture of sulphate and groundwood pulp. Hogged fuel (bark, sawdust, and non-chippable sawmill residue) is used as fuel in the generation of steam.

The main non-wood inputs that can be identified are 1.2 million tons of petroleum fuels, 1.0 million tons of chemicals and products, and 0.4 million tons of miscellaneous material. The latter includes packaging material, maintenance supplies, building material, machinery and equipment, and camp provisions. These inputs are summarized in Table 3 below.

Table 3

Inbound Shipments to the Forest Industry
1970

(Millions of Tons)

Wood and Wood Products	
Roundwood	49.3
Pulp chips	8.5
Hogged fuel and sawdust	1.0
	58.8
Non-Wood Materials	
Petroleum fuels	1.2
Chemicals and products	1.0
Miscellaneous	0.4
	2.6
Total Shipments	61.4

Freight Outbound from the Mills:

The outbound freight estimates which follow include only primary products in order to avoid double counting.

Primary products have been measured at the mills and traced to the point where they are either exported or unloaded for consumption or re-manufacture. Secondary products such as sash and doors, millwork, and the output of paper converters have not been included as the wood and paper used in their manufacture has already been accounted for as sawmill or pulpmill product.

Exports of logs and pulpwood totalling 1.2 million tons and chip exports of 0.8 million tons have already been noted. A further 0.3 million tons of other roundwood products such as poles, piling, and fence posts were also shipped from conversion plants to domestic and export markets combined.

The weight of primary manufactured products shipped from the mills in 1970 has been estimated from reported volumes. The largest quantity was lumber with an approximate weight of 9.4 million tons. Production totalled 7,656 million board feet and the average shipping weight per thousand board feet was 2,885 pounds for coastal shipments and 2,070 pounds for Interior shipments.

Shipments of softwood plywood totalled 1,731 million square feet (3/8 inch basis). At 1,000 pounds per thousand square feet, the plywood weight would be 865,000 tons. In addition 1,100 million square feet (1/8 inch basis) of softwood veneers weighing 310,000 tons were produced. About half this weight was used in the production of plywood in the province and is, therefore, included in the plywood tonnage. The remaining 165,000 tons of veneer was shipped to markets outside the province. Other wood shipments comprising shingles and shakes, fibreboard and particle board, and miscellaneous products have been estimated to total 200,000 tons.

Shipments from pulp and paper mills added another 4.5 million tons in 1970 to the amounts already reported. Included were 2.6 million tons of market pulp, 1.4 million tons of newsprint, and 0.5 million tons of other paper and paperboard.

The aggregate tonnage of primary products moving from the forest and from mills in the province to domestic and foreign markets equalled 17.5 million tons. The amounts comprising this total are summarized in Table 4 below.

Table 4

Shipments of Primary Forest Products
from British Columbia Forests and Mills
1970

(Millions of Tons)

Crude Wood Products:	
Log and Pulpwood Exports	1.2
Pulp Chip and Hogged Fuel Exports	0.9
Poles, Posts and Pilings	0.3
	2.4
Manufactured Products:	
Lumber	9.4
Plywood and Veneer	1.0
Minor Wood Products	0.2
Pulp and Paper	4.5
	15.1
Total Outbound Shipments	17.5

Total Freight by Mode of Transport:

Much of this freight is handled by more than one type of transport facility before reaching its ultimate destination. For example, lumber may be trucked from a sawmill to a rail siding, railed to a seaport and then transferred to an ocean going vessel for shipment to an off-shore market. This case is extreme but does point up the complexity of some forest product movements. Inbound freight can go through the same procedure in reverse. This section will not attempt to isolate every phase of all industry freight movements but, where possible, will identify major links in the transportation chain.

As a result of transferring products from one mode of transport to another between the points of origin and destination, an aggregation of rail, truck and water transporters cargo would appear to yield over 90 million tons of inbound raw materials rather than the calculated 61.4 million tons. This shows that the transportation network must be viewed as a system in order to avoid double counting.

One method would be to calculate ton miles for products but this would require a separate exercise beyond the scope of the present study. A simplified approach which allocates volumes to a specific mode of transport according to the principal or final mode employed has been adopted in the following analysis of inbound freight.

Table 5 presents the estimate of the various transportation modes used for the 61.4 million tons of inbound freight.

Table 5

Inbound Freight by Final Mode of Transport
1970

(Millions of Tons)

	Truck	Rail	Water	Total
Logs and Pulpwood	19.6	1.8	27.9	49.3
Pulp Chips and Hogged Fuel	1.3	3.2	5.0	9.5
Equipment and Supplies	0.3	1.1	1.2	2.6
	21.2	6.1	34.1	61.4

Most of the inbound freight is roundwood and virtually all is loaded on trucks in the logging area. The wood in then either trucked directly to a conversion plant or moved to water for rafting and towing to the mill. In addition some roundwood is transferred from truck to rail while a small amount is moved in river drives. It has been estimated that following an initial truck haul, about 92 per cent of the coastal timber harvest is moved by water in coastwise shipping. The corresponding division for the Interior region shows less than 20 per cent moving by water. The log and pulpwood volume shown in Table 5 under truck refers to roundwood that moved from forest to mill by truck only while the volume shown as water wood has first undergone a truck haul prior to the towing operation. Similarly, logs moved by rail were first removed from the woods by truck.

A certain percentage of pulp chips, equipment and supplies will undoubtedly have travelled by more than one mode of transport as well, but it is impossible from available statistics to determine an accurate division. About 1 million tons of hogged fuel and sawdust and

4 million tons of pulp chips moved in coastwise shipping. Little, if any, hogged fuel or sawdust moved by rail or truck over any significant distance.

Tables 6 and 7 present estimates of outbound shipments of minor forest products and of major products, classified by final mode of transport. Intermediate modes of transport have been identified whenever possible and are described briefly in the paragraphs following the tables.

Table 6

Outbound Freight by Final Mode of Transport
Shipments of Minor Products
1970

(Millions of Tons)

	Truck	Rail	Water	Total
Log and Pulpwood Exports	N	N	1.2	1.2
Pulp Chip and Hogged Fuel Exports	0.3	N	0.6	0.9
Poles, Posts and Pilings	N	0.3	N	0.3
Shingles, Shakes and Minor Products	N	0.2	N	0.2
	0.3	0.5	1.8	2.6

N - nil or negligible

Shipments of crude wood products, apart from converting plant inputs previously detailed, and minor primary products such as cedar poles, posts, pilings, and cedar shingles and shakes totalled 2.6 million tons. Waterborne log and pulpwood exports went to the United States and Japan in approximately equal proportion. Waterborne pulp chip and hogged fuel exports to the United States totalled almost 0.5 million tons while less than 8,000 tons of pulp chips went to Japan. The vast majority of shingle, shake, and minor product shipments went by rail to the United States, a small volume went by water to off-shore markets, and the balance were consumed domestically.

Since the statistical data available for lumber, plywood, pulp, paper and paperboard shipments are more refined than that relied upon for mill inputs and minor product shipments, a greater degree of accuracy and a higher level of significance regarding product movements was achieved. Consequently weights reported in Table 7 are estimated to the nearest ten thousand tons rather than in hundreds of thousands.

Table 7

Outbound Freight by Final Mode of Transport
Shipments of Major Products
1970

(Thousands of Tons)

	Truck	Rail	Water	Total
Lumber	580	4,270	4,520	9,370
Veneer and Plywood	220	620	190	1,030
Market Pulp	-	730	1,830	2,560
Paper and Paperboard	340	400	1,210	1,950
	1,140	6,020	7,750	14,910

A detailed breakdown of lumber and other commodity shipments, by mode of transport and region of destination, is presented in the statistical supplement accompanying this report.

As noted, the tonnages of Table 7 refer to final mode of transport only. Consequently, all product tonnages assigned to water apply to international seaborne shipping only. The 4.52 million tons of waterborne lumber does not include the 890,000 tons moved by barge in coastwise shipping. It is estimated that practically all of this barged lumber was moved to terminals for ocean going or rail transport to the final market. Furthermore, 80,000 tons of lumber left the Interior by rail for subsequent ocean transport to off-shore markets and an estimated 560,000 tons was trucked from coastal mills for loading on ships. There may be some duplication of tonnages between the 560,000 tons of intermediate trucking and the 890,000 tons of barging estimated for the Coast but this would be impossible to identify without an extensive survey of mills and transportation firms.

Prior to final shipment by rail or water, 290,000 tons of pulp and 590,000 tons of paper and paperboard moved by barge in coastwise shipping. Included in the 290,000 tons of barged pulp is about 100,000 tons of purchased or transferred pulp that was subsequently used in the production of paper within the province. In addition to the 1.13 million tons of market pulp and paper shown under rail in Table 7, 555,000 tons of pulp and 75,000 tons of kraft papers were railed from the Interior to the Coast for waterborne export.

A summary of freight generated by the British Columbia forest industry by final mode of transport in 1970 is presented in Table 8.

Table 8

Total Freight Generated by the British Columbia Forest Industry by Final Mode of Transport 1970

(Millions of Tons)

	Truck	Rail	Water	Total
Wood Raw Materials	20.9	5.0	32.9	58.8
Crude Wood Exports and Minor Products	0.3	0.5	1.8	2.6
Major Primary Products	1.1	6.0	7.8	14.9
Equipment and Supplies	0.3	1.1	1.2	2.6
	22.6	12.6	43.7	78.9

Freight Revenues:

The next objective is to estimate the total freight revenues earned by common and contract carriers handling products to and from forest industry operations. Tonnage data by commodity class are available for rail and for coastwise and international waterborne shipping but there are no corresponding revenue figures. Truck transport statistics show only total revenue earned by common and contract carriers but no commodity tonnages. Consequently, it has been necessary to estimate revenues by indirect means.

Forest industry sources have indicated that about 40 per cent of the annual timber harvest is moved by contract truckers and that the average haul is 20 to 25 miles. An average cost of 20 cents per cunit mile would yield contract trucking revenues of about $35 million, which is approximately 90 per cent of total contract trucking revenue earned in British Columbia during 1970. A special compilation prepared by Statistics Canada for the British Columbia logging industry shows that $52 million was spent in 1970 for contract trucking, booming, towing, and contract road building. Considering that the logging industry as defined by Statistics Canada does not cover the entire timber harvest, the above $35 million estimate for contract trucking of logs is not unreasonable.

In addition to roundwood, over 2 million tons of pulp chips, lumber, veneers, plywood, paper and paperboard is trucked to and from the mills. The revenue earned by truckers from the movement of this material has been estimated at $15 million.

Rail statistics show that two-thirds of all carloadings in British Columbia are forest products. After making an allowance for inbound chemicals and non-wood operating supplies, about 14 million tons of rail freight handled in the province can be attributed to the forest industry. The total Canadian rail system revenue generated by the British Columbia forest industry has been estimated at $140 million.

The remaining mode of transport, water, can be divided into coastwise and international seaborne shipping. In 1970 about 82 per cent of the reported tonnage handled in coastwise shipping and approximately one-third of international seaborne cargos loaded and unloaded in British Columbia ports could be traced to the forest industry. Drawing upon various sources of information, it has been estimated that the handling of this waterborne cargo generated $145 million in direct revenues to Canadian shipping companies and port authorities.

The total figure for freight revenue generated by the forest industry in 1970 comes to $335 million. The division by mode of transport is shown in Table 9. The total would exceed $400 million if calculated for 1972. In addition, U.S. railroads earn substantial amounts which are often prepaid by Canadian shippers.

Table 9

Estimated Freight Revenues by Mode of Transport
British Columbia Forest Industry
1970

(Millions of Dollars)

Truck	50
Rail	140
Water	145
	335

D. Origin of Goods Purchased by the Forest Industry

The origin of goods purchased by the forest industry was investigated as part of the assessment of the indirect impact of the industry on the British Columbia economy. Information was obtained from a survey of industry personnel, engineering consultants, manufacturers and distributors. The results are believed to be suitable for use as a general guide.

The values and origin of goods purchased by the forest industry are presented in Table 10. Non-wood operating and related expenditures for 1970 were compiled from special Statistics Canada tabulations prepared for this study. Capital and repair expenditures on building supplies, machinery, and equipment were based on a three-year average of estimated spending over the years 1969/71.

Table 10

Origin of Non-Wood Expenditures
British Columbia Forest Industry
1970

(Millions of Dollars)

	Operating & Related Expenditures	Capital & Repair Expenditures	Total	Per Cent
British Columbia	200	120	320	45
Other Canada	110	155	265	37
Imports	55	70	125	18
	365	345	710	100

Approximately $200 million or 55 per cent of the forest industries non-wood operating and related supplies were produced in British Columbia. In capital and repair programs, close to $120 million or 35 per cent was spent on building supplies, machinery, and equipment produced in British Columbia. The last column in Table 10 shows that British Columbia accounts for approximately 45 per cent of the forest industry's total non-wood expenditures. Other provinces profit extensively from machinery and operating purchases by the British Columbia forest sector.

CHAPTER III

EXPENDITURES AND ACTIVITIES OF THE BRITISH COLUMBIA FOREST SERVICE

The B.C. Forest Service accounts for a sizable contribution to the economy of the province in terms of expenditures on goods and services as well as direct employment. These topics are discussed in the first two sections of this chapter. In order to provide further appreciation of this agency's activities, the remaining sections deal with the functions of the B.C. Forest Service and the administration of tenures.

A. Analysis of B.C. Forest Service Expenditures

A summary of cost data, based on an analysis of the public accounts, reveals the following distribution of expenditures for the fiscal year 1970/1971.

Table 1

Expenditures by the B.C. Forest Service
Fiscal 1970/71

(Millions of Dollars)

Fire Suppression	9.8
Management, Protection and Overhead	6.8
Reservoir Improvement	3.8
Reforestation	3.7
Seasonal Staff	3.4
Coast Scaling Fund	2.5
Roads	2.2
Engineering Services	2.1
Inventory	1.9
Silviculture	1.3
Grazing	0.2
Other	6.2
Total	43.9

Note: "Other" includes $ 5.6 million in unallocated salaries.

Source: B.C. Forest Service

Chart 1 presents B.C. Forest Service receipts and expenditures from fiscal 1950/51 to 1970/71. Forest Service expenditures on major items grew from $4.9 million in 1950/51 to $43.9 million in 1970/71. Since fiscal 1970/71 expenditure includes fire suppression costs which are approximately $5.0 million above average, a "normalized" expenditure for 1970/71 would be $39 million.

Expenditures made from the Coast Scaling Fund are recovered in full from scaling fees levied against users of the scaling service. In addition, the Forest Service has recovered from B.C. Hydro approximately one-half of reservoir improvement expenditures in fiscal years 1969/70 and 1970/71.

Major changes in the composition of Forest Service expenditures in the 1950 to 1971 period are partially attributable to a more than tenfold increase in management, protection and overhead expenditures which reflect an expansion in facilities and staff both at Victoria headquarters and in the forest districts. In addition, reservoir improvement expenditures have increased considerably since 1963 and reforestation expenditures have increased tenfold since 1950.

In the fiscal year 1970/71, spending on capital account amounted to $3.2 million. These expenditures are detailed below.

Table 2

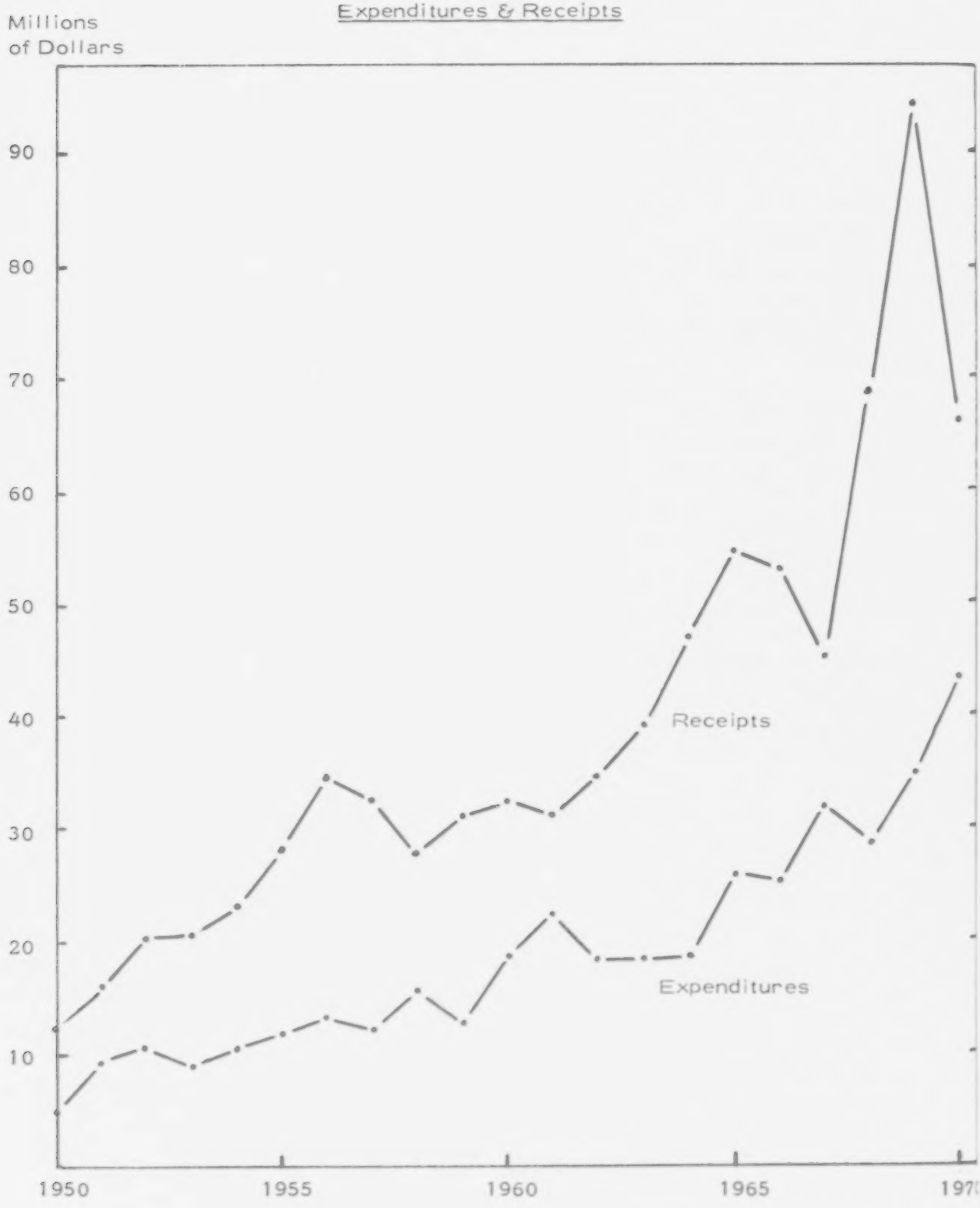
Capital Expenditures by the
B.C. Forest Service
Fiscal 1970/71

(Thousands of Dollars)

Motor Vehicles and Accessories	512
Office Furniture and Equipment	20
Equipment and Machinery	331
Acquisition and Construction of Building and Works	749
Forest Development Roads	1,587
Total	3,199

Chart 1

British Columbia
B.C. Forest Service
Expenditures & Receipts



Source: B.C. Forest Service

B. Employment in the B.C. Forest Service

In 1971 there were 2,391 persons continuously employed in the Forest Service. A further 5,513 were employed on a seasonal basis. The distribution of continuously employed staff to the Districts and to Headquarters in 1971 is as follows:

Vancouver	496
Prince Rupert	242
Prince George	348
Cariboo	8
Kamloops	335
Nelson	239
Victoria Headquarters	723
Total	2,391

Seasonal staff may be hired on a project basis or for an entire season. An accelerated reforestation program in recent years has lead to an increase in seasonal staff - 5,513 in 1971 compared to a 5-year average of 2,562. Temporarily employed fire fighters are not included in these totals. Approximately 3,000 of the seasonal staff in 1971 were employed as tree planters, primarily in the Vancouver Forest District.

Manhours of employment for seasonal and continuously employed personnel are broken down in Table 3.

Table 3

Summary of Manhours of Employment
in the B.C. Forest Service
1971

	Manhours (Thousands)	Per Cent
Seasonal		
Fire Suppression	1,039	
Reforestation	528	
Engineering	148	
Other	1,242	
Total Seasonal Staff	2,957	38
Total Continuous Staff	4,780	62
Total Staff	7,737	100

C. Functions of the B.C. Forest Service

The essential function of the B.C. Forest Service is the management of the provincial forest resource and the marketing of public timber. The extent to which the Forest Service is involved with forest management and marketing of public timber in a particular area depends on the legal status of the land involved. Table 4 summarizes the major forest service functions by land status. In the two most recently introduced tenures - Tree Farm Licences and Timber Sale Harvesting Licences - industry has a larger role in planning, protection, reforestation, and inventory than in older tenures.

The jurisdiction of the Forest Service is described in Section 5 of the Forest Act. Some of the principal areas of Forest Service administration such as stumpage and royalty administration, timber scaling and the regulation of exports are described below. Other areas not described are forest resource inventory, forest protection, reforestation, resource use planning, research, engineering and public information.

Stumpage and Royalty Administration:

Royalty was the original form of government revenue collection resulting from private use of the province's timber resource. Royalty is set at statutory rates and applies to all timber and pulp licences and leases, Dominion timber berths and some Crown-granted private lands. Certain other private lands, depending upon the date of land alienation, are royalty free. Royalty is deferred until logging and at the turn of the century was considered to be the full value of timber cut at that time.

Stumpage is the sum payable to the Crown for the sale of public timber and is in addition to any rentals, royalties and taxes that may apply to the tenure agreement. It is determined by a stumpage appraisal conducted by the Forest Service which has the objective of estimating the timber's true market value. All relevant operating costs are deducted from the selling price of the first product sold in a competitive market to obtain a net value called "conversion return". An operator's allowance for profit and risk is deducted from "conversion return" and the residual is known as stumpage. Stumpage is payable on all timber cut from Timber Sale Licences, Timber Sale Harvesting Licences and Crown land included in Tree Farm Licences.

The calculation, billing and collection of stumpage and royalty is a responsibility of the Forest Service. Stumpage and royalty payments are based on timber scale returns.

Table 4
British Columbia
Simplified Analysis of Major Forest Service Functions by Land Status

Land Status	Planning	Fire Suppression	Reforestation	Calculation of Inventory and Regulation of Allowable Cut
Temporary * Tenures	Usually logging plans required of licensee and Forest Service approval required.	Primarily Forest Service function. Licensee responsible for own cost of suppression on areas occupied.	None required.	Forest Service Inventory. No annual cut regulation. Land reverts after "cut-over" status reached.
Timber Sales	Forest Service approval required for all plans made for roads and logging for licence duration.	Forest Service responsible for detection; occupant responsible for own cost of suppression.	Forest Service function except site preparation requirements which are usually specified in the logging plan.	Forest Service Inventory. Forest Service calculates and regulates allowable cut, and cruises cutting permits.
Timber Sale Harvesting Licences	Development and logging plans required for each TSHL issued. Forest Service approval required.	Forest Service responsibility except for Licensee's fire suppression responsibility on cutting permits in good standing.	Primarily Forest Service function. Forest Service specifies and reviews site preparation for natural regeneration.	Forest Service Inventory. Forest Service calculates and regulates cut. Licensee cruises cutting permits.
Tree Farm Licences	Working plans and logging plans require Forest Service approval.	Forest Service responsible for detection. Licensee responsible for suppression unless forest closure in force or if voluntary shut down in effect.	Forest Service provides seedlings, most other functions responsibility of licensee.	Licensee inventories TFL. Forest Service specifies method, licensee's calculation of allowable cut. Subject to Forest Service approval.

* Applies to temporary tenures that are not part of a Tree Farm Licence. Temporary tenures within a TFL are subject to the same requirements as noted for TFL's.

Timber Scaling:

The Forest Service is responsible for measurement of the timber harvest in the province. This measurement, known as scaling, establishes the volume of roundwood harvested as the basis for payment of stumpage or royalty. The conventional method of scaling logs is measuring their cubic content but an alternative is weighing. All persons employed as scalers are government trained and licenced and their work is supervised by the Forest Service. Most scalers are government employees but a small and declining minority are employed by the licensee. Scaling costs, a fee if the work is done by government employees, or the wages and expenses of company scalers, are allowed as a cost in stumpage appraisals.

On the coast nearly all scaling is done by the conventional method and almost all the scalers are government employees. In the Interior weigh scaling is rapidly becoming predominant. Weigh scalers and most weigh masters are government employees. Previously conventional scaling by licensed scalers on company payrolls was common.

Regulation of British Columbia Forest Products Exports:

Forest industry exports are subject to the normal federal regulation of external trade. Additional provincial control is also established under the B.C. Forest Act over roundwood and some products with minimal processing obtained from certain tenures. These areas are Crown land, all Tree Farm Licences, and land granted after March 12, 1906. Exports from land granted before that date, land in the Dominion Railway Belt, and Indian Reserves are not subject to provincial export regulations.

Logs from lands over which the province exercises export control may be authorized for export by Order-in-Council if they are surplus to domestic industry requirements. A Log Export Advisory Committee composed of industry and Forest Service appointees makes recommendations on applications for log exports. Exports of pulp chips are also controlled as are minor forest products such as piling, poles, railway ties, crib-timber and mechanical wood pulp.

D. Tenures Administered by the B.C. Forest Service

Disposal of Crown timber takes place according to various regulations originating under Section 16 of the Forest Act: "Crown timber which is subject to disposition by the Crown shall be disposed of only by the Minister in accordance with this Act and the regulations." The tenure system employed for the disposition of Crown timber embodies the principle of timber alienation while retaining Crown ownership of forest land. The major tenures administered by the Forest Service are described below.

Temporary Tenures - Licences, Leases and Berths:

Timber and pulp licences and leases are old tenures devised by the province for the disposal of Crown timber prior to the enactment of the Forest Act in 1912. Timber berths are tenure for the alienation of timber on Federal lands granted by the province to the Dominion at the time the Canadian Pacific Railway was constructed. Timber berths are now under provincial administration as a result of a transfer to the province in 1930.

Forest Service policy is to recover land in temporary tenures as quickly as possible. In general, temporary tenures revert to the Crown after merchantable timber has been harvested.

Timber Sales:

Timber sales are the form of licence authorized by the Forest Act for disposal of Crown timber. They are awarded by public competition or, if small, by grant.

Timber Sale Harvesting Licence:

A Timber Sale Harvesting Licence is a special form of Timber Sale. The objectives of this tenure include the simplication of administration, the provision of flexibility in a licensee's operating plans, and the provision for intensified planning and management in the Public Sustained Yield Units. The Public Sustained Yield Unit (PSYU) is a Crown forest management unit administered by the Forest Service. Operations under these licences must be to a close utilization standard, unless exempted by the District Forester. The Timber Sale Harvesting Licence gives licensees established in PSYU's an opportunity to consolidate their timber rights so that they can operate at the most efficient level.

Tree Farm Licences:

A Tree Farm Licence (TFL) is a 21-year agreement which permits the alienation of Crown timber as a unit for management on a sustained yield basis.

The conceptual framework for the TFL was put forward by Chief Justice Sloan in the 1945 Report of the Commissioner of the Forest Resources of British Columbia. He recommended that the licence be composed of an applicant's existing tenures plus a sufficient supply of Crown timber to maintain economic production from conversion plants during the period necessary for reforestation. The licensee would be responsible for management of the licence under Forest Service direction. The legislation implementing the Sloan recommendations was introduced into the Forest Act in 1960.

Pulpwood Harvesting Area Agreements:

A Pulpwood Harvesting Area Agreement (PHA) guarantees the holder sufficient wood for a specified pulp mill. This licence is only granted east of the Coast mountain range and is for a period of 21 years. At the present time, pulpwood supply is usually in the form of wood chips generated by sawmills but the agreement contains a provision for roundwood if chip supply is inadequate.

A wood chip direction policy has evolved that may require as a function of a Timber Sale that a sawmill offer chips to the holder of a PHA.

CHAPTER IV

EMPLOYMENT IMPACT OF THE FOREST INDUSTRY

The employment impact of the British Columbia forest industry will be examined in this chapter. In 1970 direct forest employment in British Columbia was reported to be about 75,000. However, the indirect employment must be estimated. The first section will discuss the employment expansion factor known as the employment multiplier. In determining an appropriate multiplier, labour force data were analyzed for the forest-based community of Prince George and a part of the Okanagan which includes the cities of Penticton and Kelowna. A section is devoted to each of these sub-regions. The chapter closes with a summary of the forest industry impact and relates it to total provincial employment.

A. The Employment Multiplier

Regional economic theory suggests that employment in a community can be divided into "basic" and "non-basic" activities. Basic activities may be defined as those which produce goods and services for markets outside the local community. An example of a basic activity would be a pulp mill producing for export markets. Non-basic activities are those which produce goods and services for the local market and this includes the majority of a community's local retail outlets.

The concept of basic versus non-basic begins with the premise that a community must produce and export goods and services to survive and prosper. Most communities cannot themselves produce all the goods and services they require. Income from the sale of exports enables a community to purchase goods and services not produced locally. Implicit in the basic/non-basic concept is a cause and effect relationship in which basic activity is considered to be the generator of non-basic activity. The distinction between basic and non-basic activities is not always easily made. In small communities it can usually be assumed that all manufacturing and most primary activity is basic and that other activities are non-basic. But in larger communities some industries may contain a mixture of both basic and non-basic activities. For example, a manufacturing plant in the food and beverage industry may supply both local and external markets.

Basic activity can grow independently of the local market but non-basic activity is tied to the size of the local market and can only expand when this market expands. Additional jobs in a community's basic activities are therefore of prime importance as they tend to create other jobs in non-basic industries whenever new income from exports is spent on local goods and services. This job creating effect is referred to as the employment multiplier. The multiplier is calculated by determining the relationship between total employment and basic employment. [1]

The magnitude of the local community multiplier usually varies directly with the size and population of an area. In small centres the multiplier will be quite low because most goods and services must be obtained elsewhere. Larger centres generally have higher employment multipliers as they tend to be more self sufficient and require proportionately smaller expenditures on goods and services from outside the community.

Empirical evidence from both Canada and the United States suggests that a local community employment multiplier of 2 is common for medium sized forest-based communities. In other words, for every employee engaged in the basic forest activity, one other individual is employed in a non-basic activity.

A Canadian example is contained in a 1969 study for the Ontario Department of Lands and Forests which conducted an employment survey for three forest-based communities in Northern Ontario. One of the communities was Dryden, a pulp mill town in northwestern Ontario. The survey area had a population of 8,500 and the employment multiplier was estimated at 2.01. The other survey included the two communities of Kapuskasing and Hearst in northeastern Ontario, one a pulp mill town and the other primarily a sawmilling centre. Because these two towns are relatively close together and have complementary forest economies, a single multiplier was calculated. For the combined area which has a population of 23,000, the employment multiplier was 2.13.

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1. It is necessary to distinguish between the two common terms used to describe this relationship, that is the "basic/non-basic ratio" and the "multiplier". If 5,000 basic jobs were identified in a labour force of 15,000, the relationships would be as follows:

Basic/non-basic ratio	5,000 : 10,000	=	1:2
Multiplier	15,000 ÷ 5,000	=	3

In the United States, the U.S. Forest Service research centre in Portland has calculated basic/non-basic ratios for communities in Oregon and Washington. Their study established a basic/non-basic ratio which is equivalent to a multiplier of 2.26 for counties known to be primarily dependent on sawmilling. Another United States study was the detailed analysis by Hays B. Gamble of the local economy of two Pennsylvania counties. An income multiplier of 2.08 was derived for an area which contains a wide range of forest-based industries.[1]

B. Prince George Area Employment Survey

The community of Prince George is situated in the geographical centre of the province at the confluence of the Nechako and Fraser rivers. It is the most important single centre of lumber and pulp manufacturing in the province. Due to its location, Prince George is also the supply, service, distribution and transportation centre for central and northern British Columbia. In addition, it is the focal point for government, education, and institutional activities in the north central region of the province.

Forest-based activities in the Prince George area are dominated by a trio of pulp and paper mills. The mill capacities and products are as follows:

Northwood Pulp	290,000 TPY kraft pulp
Intercontinental Pulp	215,000 TPY kraft pulp
Prince George Pulp and Paper	250,000 TPY kraft pulp 112,000 TPY paper (sack kraft)

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1. For those who may be interested in studying the cases referred to, the sources are as follows:

   Ontario Department of Lands and Forests, "The Ontario Forest Industry, its Direct and Indirect Contributions to the Economy", 1969.

   Maki, Wilbur R., "Importance of Timber-Based Employment to the Economic Base of the Douglas Fir Region of Oregon, Washington, and Northern California", U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, Research Paper PNW 76, April 1968.

   Gamble, Hays B., "The Regional Economic Role of Forest Products Industries", Journal of Forestry, July 1968.

Sawmill capacity in the immediate vicinity of the city exceeds 400 million board feet annually. In addition, a veneer plant is also located at Prince George.

Consumption of roundwood in the wood industries located in the survey area is approximately 75 million cubic feet annually. Pulp and paper capacity in the area consumes the equivalent of 125 million cubic feet annually, the great majority of this consisting of chips from sawmills.

No current data on the Prince George labour force was available when this study was conducted. Therefore, an employment survey was conducted by the market research firm of Ben W. Crow and Associates to establish the distribution of the local labour force by industry.

As the objective was to assess the economic significance of the forest industry on the local community, it was felt that the survey area should be large enough to encompass the majority of employees engaged in the forest industry activities. The survey area was confined to a combination of B.C. Telephone Company exchanges as a telephone survey was selected as the most practical means of obtaining the detailed information required. In addition to the city of Prince George, the exchanges of Pineview, Hartway, Vanway, Salmon Valley, Red Rock, Chief Lake, and Chilako were included. The area served by these exchanges contains a population of 54,000 within a 20-mile radius of Prince George.

The primary problem in defining the extent of the survey area arose from the fact that the majority of logging operations supplying mills in the study area lay beyond these boundaries. However, it was considered that many of the employees engaged in logging would maintain households in the survey area where the major population in the region resides. Consequently, further extension of the survey area would not materially change the study findings.

The survey sample consisted of 570 residential telephone listings selected at random from the exchanges previously outlined. Calling continued until close to 90 per cent of the sampled listings had been reached. Co-operation was excellent and information was refused at only 4 per cent of the households contacted. The occupation, sex and place of work of each employed member of the household was obtained for both full and part-time workers, but not for casual part-time or infrequent short-term work. Information was also compiled on self-employed persons and households without gainfully employed members.

The employment data was classified according to the Standard Industrial Classification (SIC) industry divisions established by Statistics Canada. In cases where finer industry detail was required, the industry divisions were broken into major industry groups. Survey findings showing employment by industry are presented in Table 1.

C. Prince George Area Employment Multiplier

The employment multiplier in Prince George can be expected to be considerably larger than those cited above for smaller forest-based communities. Prince George is the largest city in the province outside the major population centres in southern British Columbia. Isolated by hundreds of miles from competing centres, it is the distribution, service, and administrative centre for northern and central British Columbia in addition to being a major forest industry manufacturing centre.

The problem referred to earlier of distinguishing between basic and non-basic activities exists in Prince George. It was assumed that the wood industries, paper and allied industries, and forest services were basic activities. Also considered as basic was 25 per cent of agriculture, manufacturing (other than forest products), construction, and the five industry groups in the service sector. This judgment is based on the relationship between the economy of Prince George itself and the larger hinterland which is serviced from that central point. For example, it was assumed that construction firms located at Prince George do a significant amount of work outside the 20-mile survey radius.

The distribution of employment in Prince George by basic/non-basic activity is presented in Table 2. This indicates that 41.1 per cent of the Prince George labour force was engaged in basic activity and 58.9 per cent in non-basic activity. This results in a basic/non-basic ratio of 1:1.43 for the Prince George survey area or, in other words, an employment multiplier of 2.43. This multiplier indicates the employment impact of the forest products industry in a community such as Prince George. In effect, each job in the forest industry is related to 1.4 jobs in other industries.

Table 1

Prince George Area Employment Survey
Employment By Industry
1972

	Full-Time		Part-* time	Total	Per Cent of Total
	Male	Female			
Agriculture	277	139	14	430	2.4
Forest Industry					
Logging and Forest Services	1,164	28	28	1,220	6.7
Wood Industries	1,278	-	18	1,296	7.1
Paper and Allied Industries	1,339	45	12	1,396	7.6
	3,781	73	58	3,912	21.4
Manufacturing Industries Other Than Wood, Paper and Allied	471	84	-	555	3.1
Construction	1,552	83	69	1,704	9.3
Transportation, Communication and Other Utilities	1,857	360	69	2,286	12.5
Wholesale and Retail Trade	3,132	554	430	4,116	22.5
Finance, Insurance and Real Estate	305	194	55	554	3.0
Community, Business and Personal Service Industries	1,413	1,469	485	3,367	18.4
Public Administration and Defense	1,109	194	27	1,330	7.3
Total	13,897	3,150	1,207	18,254	100.0

* In reporting part-time employment, two part-time employees have been treated as the equivalent of one full-time employee.

Source: Survey conducted by Ben W. Crow and Associates of Canada Ltd.

Table 2

Prince George Area Employment Survey
Percentage of Employment by Industry Division
1972

	Full-Time		Part-time	Total
	Male	Female		
Basic Component				
Agriculture	0.5	1.1	0.3	0.6
Forest Industry				
Logging and Forest Services	8.4	0.9	2.3	6.7
Wood Industries	9.2	-	1.5	7.1
Paper and Allied Industries	9.6	1.4	1.0	7.6
Manufacturing Industries Other Than Wood, Paper and Allied	0.8	0.7	-	0.8
Construction	2.8	0.6	1.4	2.3
Transportation, Communication and Other Utilities	3.3	2.8	1.4	3.1
Wholesale and Retail Trade	5.6	4.4	8.9	5.6
Finance, Insurance and Real Estate	0.5	1.5	1.1	0.8
Community, Business and Personal Service Industries	2.5	11.7	10.0	4.7
Public Administration and Defense	2.0	1.6	0.6	1.8
Total Basic	45.4	26.7	28.7	41.1
Non-Basic Component				
Agriculture	1.5	3.3	0.9	1.8
Manufacturing Industries Other Than Wood, Paper and Allied	2.5	2.0	-	2.3
Construction	8.4	2.0	4.3	7.0
Transportation, Communication and Other Utilities	10.0	8.6	4.3	9.4
Wholesale and Retail Trade	16.9	13.2	26.7	16.9
Finance, Insurance and Real Estate	1.6	4.6	3.4	2.2
Community, Business and Personal Service Industries	7.6	35.0	30.1	13.8
Public Administration and Defense	6.0	4.6	1.7	5.5
Total Non-Basic	54.6	73.3	71.4	58.9
Basic/Non-Basic Ratio 1:1.43	100.0	100.0	100.0	100.0

Note: Figures may not add due to rounding.

Source: Estimates by F.L.C. Reed and Associates Ltd.

D. Okanagan Region Employment Survey

The central part of the Okanagan was also examined to provide general background information on employment by industry and especially forest-based activity. This region, which is shown in Chart 1, includes both Kelowna and Penticton, the two major cities in the Okanagan Valley. It extends some 50 miles from north to south and 35 miles from east to west. Population within the survey region is estimated to be about 75,000.

Economic activity in this portion of the Okanagan Valley is primarily based on the forestry, agriculture, tourism and recreation industries. In recent years, secondary manufacturing has widened the economic base, partially as a result of the federal government's designated area incentive program. In Kelowna and Penticton, the number of industrial plants increased from 87 in 1962 to 146 in 1972.

Forest industries have been located in the Okanagan since the 1880's when mills supplied ties for the construction of the CPR line. As economic activity grew and broadened in the valley, mills were established for the production of lumber, sash and doors, box shooks and tree props. Forest industry activity currently includes sawmill, plywood, and corrugated box industries as well as miscellaneous wood industries with products ranging from sash and door to laminated beams.

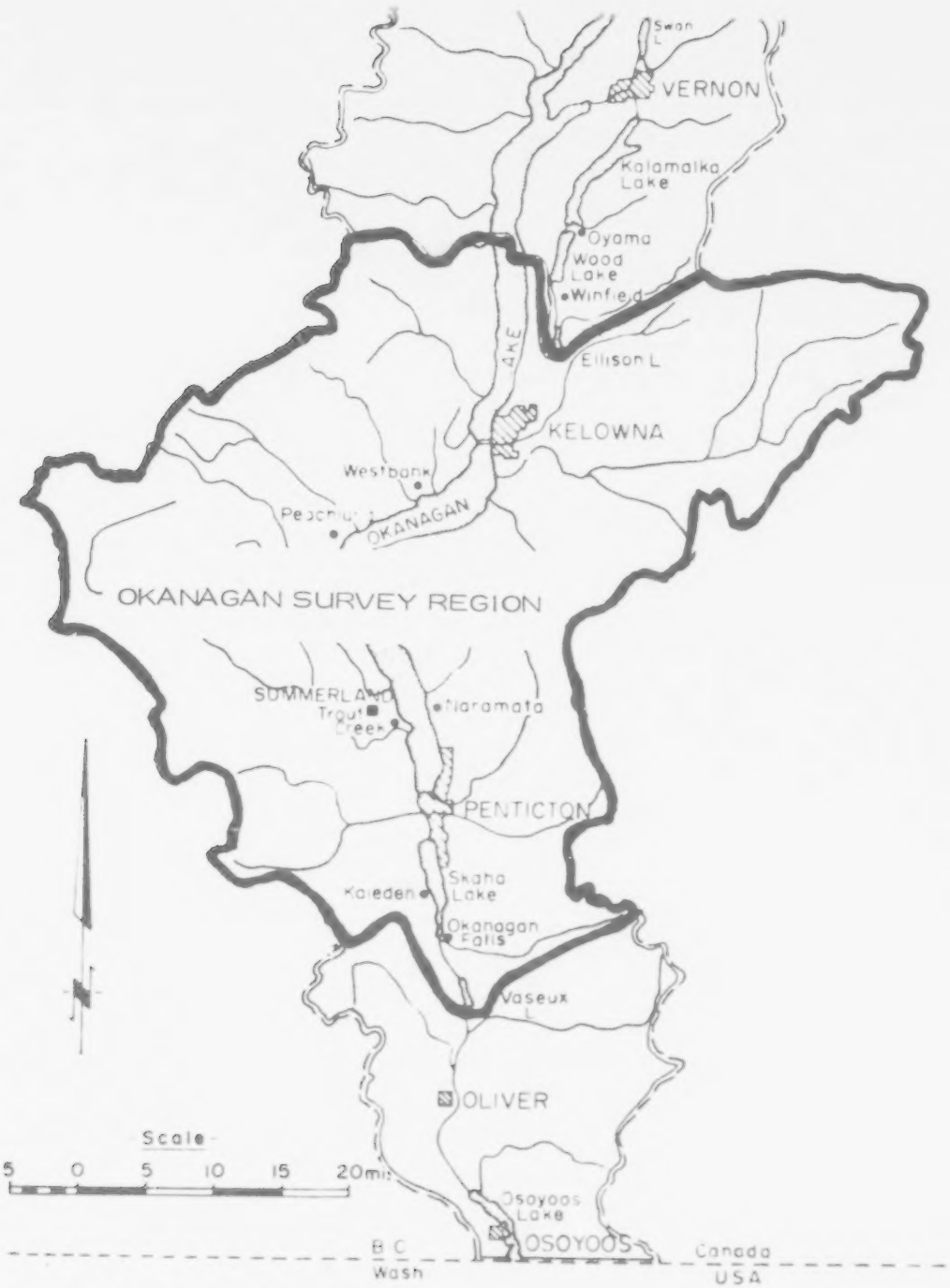
The two major forest product industry centres in this region are Penticton and Kelowna. Kelowna is the main centre of economic activity in the Okanagan Valley and is the trade and service centre for the mid and southern valley. The forest-based activities in Kelowna are dominated by Crown Zellerbach Ltd. with a sawmill, plywood plant and corrugated box plant employing over 600 personnel. In addition, there are a number of smaller sawmills in this general area as well as miscellaneous wood industries.

Forest-based activity in Penticton is generally limited to sawmilling and miscellaneous wood industries. The largest forest industry producer in Penticton is Northwood Properties with approximately 125 sawmill employees.

Roundwood consumption in the wood processing plants in the Okanagan survey area has been estimated at 40 million cubic feet.

Chart 1

OKANAGAN REGION EMPLOYMENT SURVEY



Current data on the labour force by industry in the Okanagan Region were not available from Statistics Canada at the time of this study. Consequently labour force estimates prepared in 1970 for the Canada - British Columbia Okanagan Basin Agreement "Economic Growth Study" have been adopted for the region and presented in Table 3. The analysis is handicapped at this point by the absence of detailed statistics. However, it is expected that the estimates in Table 3 will approximate census data which should be available by mid 1973.

Preliminary findings of the Okanagan Basin study indicate that the forest industry accounted for 6 per cent of total employment in the Okanagan survey region in 1970. Average employment associated with the tourist industry was estimated by the Basin Study team to be 829 or 4 per cent of total employment. As employment in the Okanagan tourist industry is seasonal, this average figure would be considerably higher in the summer months.

E. Okanagan Region Employment Multiplier

The division of employment into basic and non-basic activity for the Okanagan survey region is presented in Table 4. As in the previous survey, it was assumed that the wood industries, paper and allied industries and forestry services were basic activities. All mining activities in the Okanagan were also assumed to be basic. In addition, approximately 35 per cent of the agriculture, manufacturing other than forest products, construction and service industries were considered basic activities. The corresponding percentage of basic activity was 25 per cent in Prince George. The reason for a higher figure in the Okanagan is that the economy in this region is more highly developed and integrated.

By this method, some 40.1 per cent of the labour force in the Okanagan region was found to be engaged in basic activities. This results in a basic/non-basic ratio of 1:1.49 which corresponds to a multiplier of 2.49.

F. Indirect Employment Generated by the Forest Industry

An estimate of indirect employment supported by the British Columbia forest industry will be presented in this section. Direct employment in the forest industry is reported by Statistics Canada to have been

Table 3

Okanagan Region Employment Survey
Employment By Industry
1970

	Employment	Per Cent of Total
Agriculture	1,508	7.8
Mines and Quarries	357	1.8
Forest Industry		
Logging and Forest Services	159	0.8
Wood Industries	969	5.0
Paper and Allied Industries	35	0.2
	1,163	6.0
Manufacturing Industries Other Than Wood, Paper and Allied	1,799	9.3
Construction	1,492	7.7
Transportation, Communication and Other Utilities	1,055	5.4
Wholesale and Retail Trade	5,151	26.5
Finance, Insurance and Real Estate	1,149	5.9
Community, Business and Personal Service Industries	4,729	24.4
Public Administration and Defense	1,021	5.3
Total	19,424	100.0

Source: Economic Growth Study; Canada - British Columbia Okanagan Basin Agreement

Table 4

Okanagan Region Employment Survey
Percentage of Employment By Industry Division
1970

Basic Component	
Agriculture	2.7
Mines and Quarries	1.8
Forest Industry	
Logging and Forest Services	0.8
Wood Industries	5.0
Paper and Allied Industries	0.2
Manufacturing Industries Other Than Wood, Paper and Allied	3.3
Construction	2.7
Transportation, Communication and Other Utilities	1.9
Wholesale and Retail Trade	9.3
Finance, Insurance and Real Estate	2.0
Community, Business and Personal Service Industries	8.5
Public Administration and Defense	1.9
Total	40.1
Non-Basic Component	
Agriculture	5.1
Manufacturing Industries Other Than Wood, Paper and Allied	6.0
Construction	5.0
Transportation, Communication and Other Utilities	3.5
Wholesale and Retail Trade	17.2
Finance, Insurance and Real Estate	3.9
Community, Business and Personal Service Industries	15.8
Public Administration and Defense	3.4
Total	59.9
	100.0

Source: Developed from Okanagan Basin study data

74,551 in 1970. This is made up of 61,636 production and related workers, 12,363 administrative, sales and head office employees, and 552 working owners and partners. These totals are distributed among the three main components of the industry in Table 5 below.

Table 5

Direct Employment in the British Columbia Forest Industry 1970

	Logging	Wood Industries	Paper and Allied Industries	Total
Production and Related Workers	15,884	33,514	12,238	61,636
Administrative, Sales and Head Office	2,697	4,815	4,851	12,363
Working Owners and Partners	394	158	-	552
	18,975	38,487	17,089	74,551

Source: Statistics Canada

Two types of indirect employment can be distinguished:

1. non-basic employment in the local forest industry communities themselves
2. employment in other areas in industries such as transport, construction and equipment manufacture.

The first type can be estimated from the relevant local community multiplier but the second type must be secured by other methods.

It has already been established that the basic/non-basic ratio in one-industry forest communities is generally about 1:1, which corresponds to an employment multiplier of 2. In larger forest industry communities the multiplier is expected to be higher, due to their greater degree of self-sufficiency. This indicates that indirect employment in forest industry towns must be at least as large as direct employment.

The amount of indirect employment in transportation, construction and equipment manufacture is related to the scale of the forest industry's operations. British Columbia forest industry purchases of non-wood materials and of supplies such as chemicals and fuels were estimated in Chapter II to have been about $200 million in 1970. The labour component embodied in these purchases would be about 20 per cent or $40 million. This is conservative as it includes only wage payments in the final stage of production. The reported average annual earnings of those employed in producing these goods suggests indirect employment of about 3,600.

A large segment of the construction industry is also supported by the forest industry. In Chapter II, capital and repair expenditures in the forest industry were averaged over a three year period to reduce yearly fluctuations. The labour content of contractor expenditures on materials, machinery and equipment of British Columbia origin is estimated at one quarter of the $120 million total. In addition, earnings of employees of on-site contractors totalled $80 million. This yields a labour element of $110 million which in turn has been equated to 8,000 indirect jobs.

Similar calculations were made for employment in the transportation of forest products and inbound materials and supplies. Based on the total transportation revenue of the forest industry presented in Chapter II, an estimated 16,500 jobs are identified as part of the indirect impact.

Other indirect employment results from activity of the B.C. Forest Service. In 1970 full-time employees of the Forest Service numbered 2,300 while part-time work amounted to the equivalent of approximately 800 full-time jobs. The purchase by the Forest Service of supplies and contract services provided the equivalent of another 600 jobs. These three sources account for another 3,700 jobs.

The previous four paragraphs have estimated some 31,800 indirect jobs which are primarily outside the forest-based communities. The employment multiplier process works through these indirect jobs just as it does through those in the forest-based communities. The result is total indirect employment outside the forest communities of 63,600. Together with the 74,600 indirect jobs in the forest-based communities, total indirect employment reaches 138,200.

It should be stressed that this estimate of indirect employment must fall short of the true total. For example, firms outside of the forest-based communities providing financial, business, engineering and passenger transportation services rely on the forest industry for a share of their activity. In addition, other sources of indirect employment such as the labour embodied in machinery and supplies prior to the final stages of manufacture and the impact of forest access roads on tourism can only be estimated in rather general terms.

A summary of direct and indirect employment supported by the British Columbia forest industry is presented in Table 6. The total is approximately 213,000. This implies a forest industry multiplier of 2.8 for the province of British Columbia. In other words, each new job in the British Columbia forest industry is associated with 1.8 additional jobs in the province. As our estimate of indirect employment was conservative, we believe that the provincial multiplier must exceed 3. This could be verified by detailed study of indirect activities mentioned in the previous paragraph.

In conclusion, the foregoing method of determining a multiplier would not be necessary if input/output and other basic data were available for the provincial economy. Nevertheless, we believe it effectively illustrates the process of employment generation in the British Columbia forest industry.

G. Forest-Based Employment in a Provincial Perspective

In order to place the forest sector in perspective, Table 7 has been prepared showing employment in the entire province by major industry group. Average employment in 1970 has been estimated at 810,000. In that year forest industry firms employed 74,000 or 9.1 per cent of the provincial total.

Table 6

Approximate Direct and Indirect Employment
Supported by the Forest Industry
1970

(Employees)

Direct Forest Industry Employment			74,600
Indirect Employment			
1. Community Multiplier Effect		74,600	
2. Regional Impact			
a) Material and Operating Supply Expenditures	3,600		
b) Capital and Repair Expenditures	8,000		
c) Transportation Services	16,500		
d) B.C. Forest Service	3,700		
		31,800	
3. Regional Multiplier Effect		31,800	
			138,200
Total Direct and Indirect Employment			212,800

Table 7

Estimated Employment By Industry
British Columbia
1970

	Thousands		Per Cent
Primary Industries			
Agriculture	23		
Logging	19		2.3
Other	21		
		63	
Manufacturing			
Wood Industries	38		4.7
Paper and Allied	17		2.1
Other	86		
		141	
Construction		53	
Transportation, Communication and Other Utilities		87	
Trade		156	
Finance, Insurance and Real Estate		42	
Community, Business and Personal Service		223	
Public Administration		46	
Total		810	

Source: Statistics Canada and unpublished sources

Indirect employment supported by the forest sector was calculated in the previous section. It was shown that at least 2 indirect jobs are associated with each direct job in the forest industry. It follows from this reasoning that the forest industry supports a minimum of 225,000 full-time employees or nearly 30 per cent of total employment in British Columbia.

Similar studies have not been done for other basic industries. We are aware of the danger in doing industry impact studies in isolation and have therefore conducted this analysis along conservative lines.

CHAPTER V

PUBLIC REVENUE FROM THE BRITISH COLUMBIA FOREST INDUSTRY

Previous chapters have dealt with the forest industry's role in the generation of employment in the provincial economy and have outlined private and public expenditures related to the industry's activities.

This chapter will identify revenues accruing to the various levels of government from industrial forestry. The main emphasis is placed upon provincial revenues, but federal and to a lesser extent municipal tax revenues are also taken into account.

Only tax revenues obtained directly from the industry are estimated, although there is a further expansion through the multiplier effect. An estimate of corporate taxes paid by firms partially dependent upon the forest sector is not attempted.

An analysis of the indirect effects of resource development in relation to employment has already been presented in Chapter III. Consequently, the estimate of personal taxes paid includes those paid by both direct and indirect employees of the industry.

A. Forest Service Revenues

A detailed breakdown of Forest Service revenues in each fiscal year from 1940 to 1971 is presented in the Statistical Appendix and Chart 1 shows the principal trends. Table 1 shows the main sources of revenue in the last four calendar years.

Stumpage has been by far the largest source of provincial forest revenue since 1947. It reached an all time high of $78.3 million in 1969 and amounted to 85 per cent of direct forest revenue. This high percentage reflects the fact that most of the British Columbia timber harvest comes from Crown lands under agreements calling for payment of stumpage. As the principal determinants of stumpage are log prices (Coastal Region), and lumber prices (Interior Region), stumpage can

Chart 1

British Columbia

B.C. Forest Service Receipts

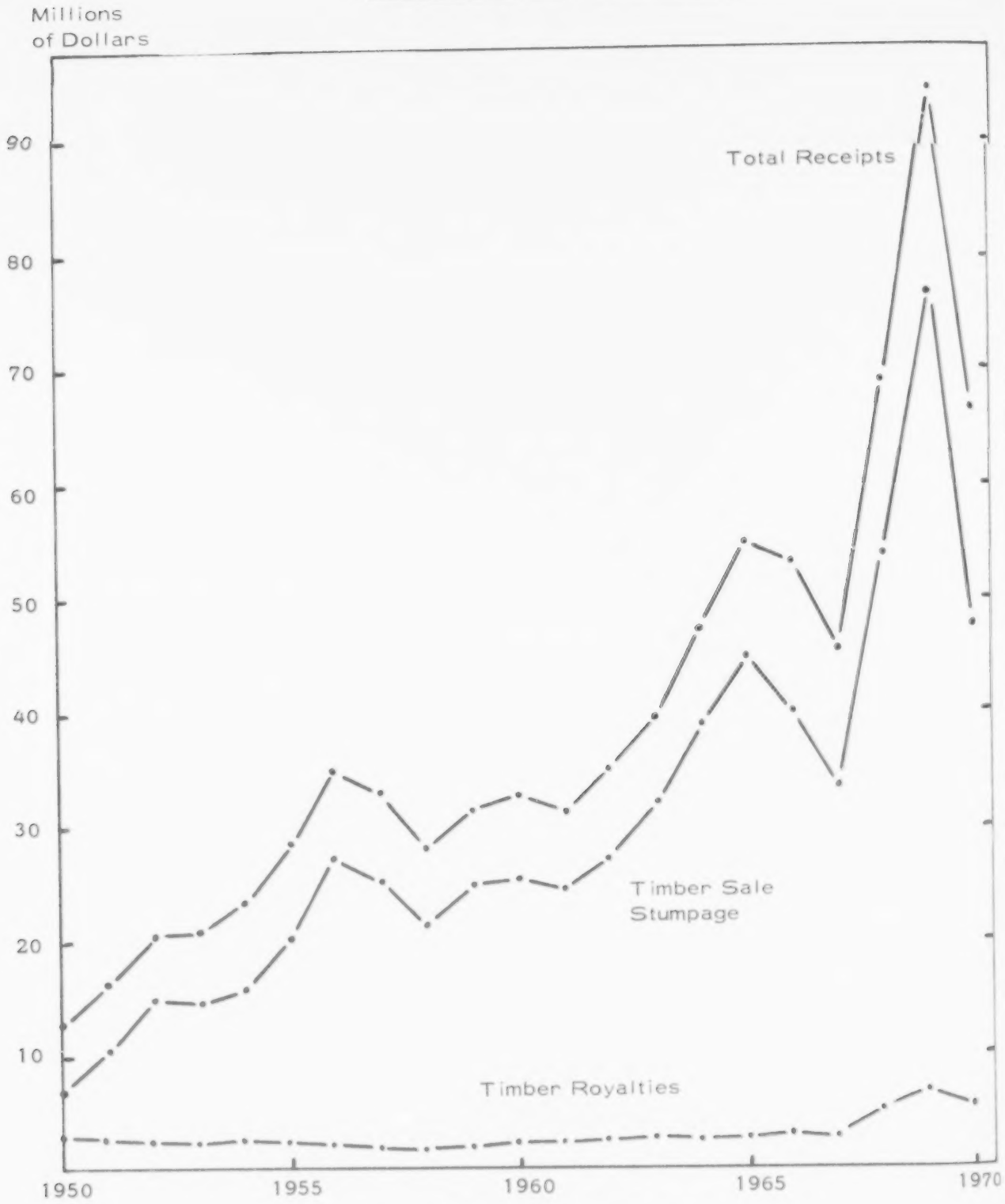


Table 1

Summary of Forest-Based Revenue
Collected by the B.C. Forest Service

(Millions of Dollars)

	1968	1969	1970	1971
Stumpage	44.3	78.3	53.5	49.7
Royalties	5.0	6.3	6.2	5.6
Scaling Fees	2.4	2.4	2.7	2.5
Timber Sales, Licences, Leases and Berths	1.8	1.8	1.8	1.6
Miscellaneous	2.7	3.1	3.4	3.9
Total	56.2	91.9	67.6	63.3

Source: B.C. Forest Service, Annual Reports

vary quite sharply from year to year. The drop in 1970 and 1971 was caused by a decline in lumber and wood product markets which in turn depressed log prices. Stumpage revenue recovered in 1972 to a new record high.

Royalty payments, the second most important source of forest revenue, are much steadier. Royalties are not affected by fluctuations in log prices as they are based upon species and grade, form of tenure, and geographic area. Scaling fees are the next largest category, followed by rentals and fees from timber sales, licences, leases and berths. Almost half of the miscellaneous revenues are derived from the forest protection tax. Also included in the miscellaneous category are grazing permits and fees since the management and administration of grazing ranges is a Forest Service responsibility.

B. Logging Income Tax

The province levies a tax on the net income of logging companies or company logging divisions. The logging tax rate was increased on April 1, 1968 from 10 to 15 per cent and the minimum net income base was lowered from $25,000 to $10,000 per year. A firm is allowed to deduct from gross federal tax the lesser of two-thirds of provincial logging tax or 6-2/3 per cent of income for the year from logging.

Over the past 12 years the yield of this tax has varied from a low of $3.4 million in 1960/61 to a high of $23.9 million in 1969/70. The increase in logging tax collected in fiscal 1968 was largely a result of the increase in tax rate while the substantial increase in the following year can be attributed to considerably higher log and lumber prices. The softer market prevailing during 1970/72 is reflected in the decline in logging tax revenues. The substantial upturn in markets during 1972 should result in record logging tax collections during 1972/73.

Table 2

British Columbia Logging Tax Revenue

(Thousands of Dollars)

Fiscal Year	Amount Collected
1959/60	3,513
60/61	3,376
61/62	5,553
62/63	4,079
63/64	8,807
1964/65	9,213
65/66	7,080
66/67	6,553
67/68	7,988
68/69	10,425
1969/70	23,941
70/71	13,416
71/72	8,977

Source: Department of Finance, Victoria

C. Corporate Income Tax

Statistics on the actual tax yield by industry are only published on a Canada-wide basis. Provincial all-industry totals have been published but they have not been analyzed on a single industry basis by the Provincial Department of Finance. Consequently, this section relies on taxable income data available from Statistics Canada publications.

Table 3 sets out net taxable income reported by forest industry firms in British Columbia and Canada for 1965 to 1970. Taxable income earned by the British Columbia forest industry increased from less than one-third of the Canadian forest industry total in 1965/66 to well over half by 1969. In 1970 forest industry net earnings and taxable income fell drastically as a result of depressed market conditions, particularly in the market pulp and lumber sectors. The British Columbia industry was especially hard hit as it is more dependent upon lumber and pulp export markets than Ontario and Quebec firms. Partial recovery was experienced during 1971 and the strong wood products market and strengthening pulp markets in 1972 may restore British Columbia forest industry taxable income to the 1969 record level. Consequently 1970 was considered as an abnormal year for the British Columbia forest industry, one well below the longer term trend line. For this reason 1969 was chosen for comparative analysis.

Table 4 reveals that net taxable income in the forest industry outside of British Columbia actually declined between 1965 and 1969 as small gains in the logging and wood industries were more than offset by a slump in pulp and paper industry net income. Within British Columbia, all sectors of the forest industry exhibited gains in net income, with the wood industries leading on both an absolute and relative basis.

It should be noted that in both Tables 3 and 4 the Statistics Canada breakdown between logging, wood industries and pulp and paper industries is made according to the Standard Industrial Classification and new establishment concept which classified firms on the basis of their principal activity. This means, for example, that a firm engaged in logging but having its main activity in sawmilling will be allocated in total to the wood industry. Consequently any taxable income earned in logging by such a firm will not be recorded under the logging industry.

Table 3

Canada and British Columbia

Net Taxable Income of Forest Industry Firms

(Millions of Dollars)

Year and Region	Logging	Wood Industries	Pulp, Paper & Allied Industries	Total Forest Industry
1965 Canada	19.3	49.1	244.0	312.4
British Columbia	16.3	23.8	62.8	102.9
B.C. Share	85%	49%	26%	33%
1966 Canada	16.2	54.1	195.9	266.2
British Columbia	13.7	25.7	36.9	76.3
B.C. Share	85%	48%	19%	29%
1967 Canada	13.3	60.3	189.3	262.9
British Columbia	10.7	30.7	62.2	103.6
B.C. Share	81%	51%	33%	39%
1968 Canada	24.1	116.3	205.2	345.6
British Columbia	21.0	79.8	83.8	184.6
B.C. Share	87%	69%	41%	53%
1969 Canada	26.7	135.2	241.9	403.8
British Columbia	23.1	91.6	106.9	221.6
B.C. Share	87%	68%	44%	55%
1970 Canada	21.5	39.2	144.8	205.5
British Columbia	18.6	11.2	42.9	72.7
B.C. Share	86%	28%	29%	35%

Source: Statistics Canada

Table 4

British Columbia and Other Provinces
Changes in Forest Industry Net Taxable Income
1965 and 1969

(Millions of Dollars)

Forest Industry Sector	1965		1969		Net Change	
	B.C.	Other Provinces	B.C.	Other Provinces	B.C.	Other Provinces
Logging	16.3	3.0	23.1	3.6	+ 6.8	+ 0.6
Wood	23.8	25.3	91.6	43.6	+ 67.8	+18.3
Pulp, Paper and Allied	62.8	181.2	106.9	135.0	+ 44.1	-46.2
Total	102.9	209.5	221.6	182.2	+118.7	-27.3

Note: The year 1969 has been chosen as a more normal year than 1970.

Source: Statistics Canada

However, the assessment and collection of provincial logging tax employs an entirely different concept. All firms, including integrated companies with logging divisions, have their logging activity isolated and the logging tax is applied against net income attributed to this activity. This situation can lead to an apparent contradiction. For example, the British Columbia logging tax collected during fiscal 1969/70 (Table 2) is more than the net taxable income reported by Statistics Canada for the logging industry in 1969 (Table 3). The explanation, apart from the slight difference in periods covered, is that a considerable portion of logging income is included by Statistics Canada in the net taxable incomes shown in Table 3 for the wood and pulp and paper industry.

Despite the lack of taxation data on a provincial basis, an effort has been made to estimate provincial and federal corporate income taxes paid by the forest industry. The federal tax estimates of Table 5 were

made by assuming that the provincial share of income tax was comparable to the industry's share of total net taxable income declared by the Canadian forest industry. For example, in 1969 the British Columbia wood industries accounted for 68 per cent of net taxable income declared by all Canadian firms within this industry grouping (see Table 3). Applying the same percentage to federal tax paid by the Canadian industry in 1969 yields a British Columbia wood industry tax burden of $31.6 million in federal tax during that year.

Since Quebec and Ontario collect provincial income tax directly from firms, these statistics are published separately. The federal government collects provincial income tax on behalf of the remaining provinces but no breakdown by province is available. Provincial tax collected from the British Columbia forest industry was, therefore, estimated by subtracting Quebec and Ontario provincial tax from total Canadian provincial tax payments and then applying an appropriate ratio to this residual figure. This method yields a British Columbia wood industry provincial tax burden of $7.5 million in 1969.

As a check against the above procedures, net income declared by the total British Columbia forest industry was analyzed using the appropriate federal corporate income tax rates, provincial tax abatement, and logging tax credit. This method yields a total provincial tax of $22.2 million and a net federal tax of $76.1 million, or a total British Columbia forest industry corporate tax bill of $98.3 million. This is very close to the $96.2 million shown for 1969 in Table 5.

D. Personal Income Tax

Information provided on personal income tax returns is not sufficient to allocate incomes to individual industries. Consequently, personal income taxes paid by forest industry employees must be estimated from employment and payroll data given in the annual census of industry published by Statistics Canada. This shows that 1970 direct employment totalled 74,551 and that wages, salaries and withdrawals totalled $623.8 million. This yields an average forest industry income per person in British Columbia of about $8,370. Similar data from the B.C. Forest Service showed the 2,391 regular employees in 1970 earned $16.5 million, an average of about $6,900 per employee.

Table 5

Canada and British Columbia
Income Taxes Reported by Forest Industry Firms

(Millions of Dollars)

Year and Sector	Canadian Firms[a] Net Federal	Canadian Firms[a] Provincial	Canadian Firms[a] Total	B.C. Firms[b] Net Federal	B.C. Firms[b] Provincial[c]	B.C. Firms[b] Total
1965						
Logging	6.0	2.2	8.2	5.1	1.9	7.0
Wood	17.2	4.6	21.8	8.4	2.3	10.7
Pulp and Paper	92.9	24.7	117.6	24.2	6.4	30.6
	116.1	31.5	147.6	37.7	10.6	48.3
1966						
Logging	3.9	1.3	5.2	3.3	1.1	4.4
Wood	16.0	4.9	20.9	9.2	2.4	11.6
Pulp and Paper	77.9	20.4	98.3	14.8	3.9	18.7
	97.8	26.6	124.4	27.3	7.4	34.7
1967						
Logging	3.5	1.4	4.9	2.8	1.1	3.9
Wood	19.3	6.1	25.4	9.8	3.1	12.9
Pulp and Paper	72.9	20.6	93.5	24.1	6.8	30.9
	95.7	28.1	123.8	36.7	11.0	47.7
1968						
Logging	6.9	2.0	8.9	6.0	1.5	7.5
Wood	37.8	10.5	48.3	26.1	6.8	32.9
Pulp and Paper	78.5	20.7	99.2	32.2	8.2	40.4
	123.2	33.2	156.4	64.3	16.5	80.8
1969						
Logging	7.0	2.3	9.3	6.1	1.5	7.6
Wood	46.4	12.5	58.9	31.6	7.5	39.1
Pulp and Paper	92.1	23.4	115.5	40.5	9.0	49.5
	145.5	38.2	183.7	78.2	18.0	96.2
1970						
Logging	4.4	1.5	5.9	3.9	1.3	5.2
Wood	12.2	3.8	16.0	3.5	0.8	4.3
Pulp and Paper	56.9	15.5	72.4	17.1	5.1	22.2
	73.5	20.8	94.3	24.5	7.2	31.7

a) actual
b) estimated
c) net of provincial logging taxes

Source: Statistics Canada and
F.L.C. Reed and Associates Ltd.

An analysis was then made of personal incomes and deductions in Alberni and Prince George, the only two forest industry centres in British Columbia for which personal income tax statistics are published. Alberni was selected for analysis because it is relatively more dependent upon the forest industry than Prince George. The personal exemption reported for Alberni related to an average income of approximately $7,250. This is lower than the previously calculated forest industry average because Alberni includes the retail and service sectors where average earnings are low. Nevertheless, the personal exemption data are considered to be relevant to the forest industry as they provide the most representative picture available of family, pension plan, and employment related deductions.

The only other source of information on personal exemptions is a Canada-wide compilation of tax returns by income groups. The $8,000 to $8,500 group was compared to the Alberni data and the results did not differ substantially. Alberni averages have therefore been used in the following estimates.

Using $2,275 as the average deduction for forestry employees results in taxable income of $6,090 in the industry sector and $4,630 in the Forest Service. Personal income tax tables for 1970 show that this would yield about $23.0 million in provincial tax and $87.1 million in federal tax.

The taxation statistics also indicate that a further $6 million would have been collected under provisions of the Canada Pension Plan but these amounts have been excluded from the summary presented at the end of the chapter.

E. Provincial and Federal Sales Taxes

The province of British Columbia levies a general retail sales tax (Social Services Tax) of 5 per cent on most items. Excluded are food, motor and heating fuels, prescription drugs, children's clothing and footwear, school supplies, and farm equipment. Collections totalled $205.8 million in 1969/70 and $208.5 million in 1970/71. The provincial Department of Finance made a special estimate for this study of the breakdown between individuals and firms.

Table 6

British Columbia
Social Services Tax Collections

(Millions of Dollars)

Fiscal Year	Individuals	Firms	Total Collections
1969/70	109.1	96.7	205.8
1970/71	110.5	98.0	208.5

Source: Department of Finance, Victoria

The method of collection is such that these Social Services Tax figures are not recorded by industry so the contribution of the forest industry and its employees must be estimated. As 9.1 per cent of the employed labour force was in the forestry sector in 1970, one can assume that at least this proportion of the provincial sales tax was paid by industry employees. Although persons not in the labour force make purchases upon which sales tax is levied, forest industry earnings (and consequently purchasing power) are significantly higher than the provincial average. Thus provincial sales tax paid by forest industry employees must be at least $10.1 million.

An unpublished report prepared by chartered accountants indicated that certain forest industry companies paid $8.4 million in Social Services Tax during 1970. As the participating firms represented about 60 per cent of the British Columbia industry, the Social Services Tax payments of the whole forest industry in 1970 must have been about $14.0 million.

The federal sales tax is 12 per cent of the manufacturer's sales price of domestic goods or of the duty-paid value of imported goods. Exceptions are building materials, where the rate is 11 per cent, and exempt items including production machinery and apparatus, and materials consumed directly in the process of manufacture. In the absence of published information, it has been necessary to analyse census of industry data to estimate forest industry payments of this tax.

The indications are that no more than 7 per cent of all materials and supplies or 14 per cent of non-wood purchases are liable for federal tax. In that case, the payments in 1970 would be $12.0 million plus an additional $6.5 million on building materials, for a total federal sales tax of $18.5 million.

The final significant tax for which an estimate has been attempted is the gasoline, motive fuel, and fuel oil tax. The provincial gasoline tax was 13 cents per gallon in 1970 with a rebate of 12 cents per gallon allowed for off-highway use. The forest industry used 16 million gallons during 1970 and an estimated 65 per cent was consumed off-highway. This would yield $0.8 million from the forest industry out of total provincial gasoline tax receipts of $74.6 million.

Federal sales tax is also charged on gasoline and there is no rebate for off-highway use. The federal levy in 1970 is estimated at $0.4 million.

Diesel fuel also attracts provincial and federal taxes, while fuel oil such as "bunker C" is liable for provincial tax only. The provincial tax is 15 cents per gallon on diesel fuel, with a full refund for off-highway use, and 1/2 cent per gallon on fuel oil. Unfortunately diesel fuel and other fuel oils are reported together. In 1970 the industry used 215 million gallons at a cost of $22.5 million. Assuming that 170 million gallons were fuel oil and 45 million gallons were diesel (and that 85 per cent of diesel was off-highway) the yield is $1.9 million in provincial and $0.9 million in federal sales tax.

F. Taxes on Forest Land, Buildings and Equipment

The provincial government levies taxes on privately held rural forest land and timber, and on forest industry improvements in rural areas. In addition, municipalities levy taxes upon forest industry improvements within their boundaries.

Provincial tax assessments made upon private forest lands are collected under a series of agreements and Acts which can be logically divided into two categories. The first relates to tax agreements attached to Crown grants, taxes assessed under the E & N Land Taxation Act, and forest land and tree farm land taxes levied under the Taxation Act.

The second category refers to school and local government taxes. According to Department of Finance records, taxes levied under the above authorizations totalled $10.7 million in fiscal 1970/71.

The amount of rural area property taxes levied by the provincial government on forest industry improvements is readily available from the Department of Finance. However, the department does not collect statistics relating to municipal taxation of the forest industry. Consequently, the municipal tax payments have been estimated from other available information.

Taxes on forest land and forest industry improvements, which totalled an estimated $40.0 million in fiscal 1970/71, have been summarized in Table 7. These figures do not include the forest protection tax which was detailed earlier under revenues collected by the B.C. Forest Service.

Table 7

British Columbia
Taxes on Forest Land, Buildings and Equipment

(Millions of Dollars)

	1969/70		1970/71	
	Provincial	Municipal	Provincial	Municipal
Forest Land and Timber Taxes				
a) Crown Grant, E & N, and Taxation Act	4.0	-	5.4	-
b) School and Local Government	4.1	-	5.3	-
Forest Industry Improvements	8.6	19.4	8.9	20.4
Total	16.7	19.4	19.6	20.4

Note: Municipal taxes are estimated.

Source: Department of Finance, Victoria and F.L.C. Reed and Associates Ltd.

G. Miscellaneous Taxes

A large item in the British Columbia general revenues is motor vehicle licences and permits which totalled $35.5 million in 1969/70 and $37.1 million in 1970/71. Charges vary considerably depending on the size and type of vehicle and licences are not required for vehicles that are operated off-highway at all times. There is no readily available basis for allocating licence and permit charges to a specific industry.

The forest industry and its employees also contribute to public revenues through tobacco tax, liquor tax, succession duties, business tax, and contributions to Workmen's Compensation and Unemployment Insurance funds. The allocation of these revenues to a single sector of the economy would be arbitrary and no attempt has been made to do so.

However, there is one other federal item which may be estimated for the forest industry, that is import duties on machinery and supplies. A direct compilation of import duties paid by the forest industry and its suppliers has not been possible. However, in Chapter II it was estimated that about $125 million worth of capital equipment and operating supplies were imported. Probably no more than half was dutiable. An average rate of 10 per cent would yield a total tariff of about $6.3 million. This is most likely a maximum and this amount has been entered in Table 8 which summarizes tax revenues in both 1969 and 1970.

H. Indirect Tax Revenues

To present a more complete picture of the forest industries contribution to public revenue, it would be permissable to trace tax revenue back to supplying industries and their employees as was done in the case of employment. But the available data are not considered sufficiently refined to make this feasible.

There is, however, one straightforward calculation which can be made using the employment expansion multiplier developed in Chapter IV. It was shown that every job within the forest industry is associated with a minimum of 1.8 jobs in other industries. Applying this expansion ratio against 1970 forest industry employment yields about 138,000 jobs in the sectors servicing and supplying the industry. Assuming average annual earnings equal to the industrial composite produces corresponding wages and salaries of $991.1 million. These earnings would yield $31.0 million in provincial personal income tax and $17.4 million in Social Services Tax. Federal income tax payments would amount to $119.7 million.

Revenues collected by that portion of the transportation industry which services the forestry sector have already been determined and it would be possible to estimate the relevant corporate income tax payable. However, this would only provide a small part of the total industrial group involved in supplying and servicing the forest industry. Manufacturers and suppliers of chemicals, petroleum products, machinery, equipment, foodstuffs, and numerous other operating supplies and services would also have to be investigated. Rather than undertake the involved calculation necessary to determine all indirect tax revenues, it is sufficient to simply point out that the connection does exist.

I. Summary of Public Revenue

A summary of public revenue generated by forest sector activity is presented in Table 8. The table illustrates the relationship between B.C. Forest Service receipts and other provincial revenue stemming from the forest sector. For instance, Forest Service receipts were approximately $92 million in 1969. In addition to these receipts, $125 million was paid to the province by forest industry firms and their employees. These two contributions to provincial revenues total $217 million, which is equivalent to 19 per cent of the British Columbia government revenue for the fiscal year 1969/70. A further $46.5 million was paid to the province in the form of personal income and social service taxes paid by indirect forest industry employees.

Federal and provincial revenue from forest industry activity in British Columbia totalled $557 million in 1969. It is interesting to note that the federal revenue of $294 million exceeded provincial revenue by $31 million in 1969. This is primarily a result of the federal government taking a larger share of the high yielding corporate and personal income taxes.

In 1969, B.C. Forest Service stumpage and royalty receipts amounted to $4.86 per cunit of roundwood harvested. Other provincial tax revenue generated by the forest industry and its employees was equivalent to $6.60 per cunit of roundwood for a total of $11.46 per cunit. This total may be increased to $13.92 per cunit when taxes paid by indirect forest industry employees are taken into account.

This demonstrates that stumpage from the sale of public timber is only the first installment in a chain of revenue dollars accruing to provincial and federal treasuries.

Table 8

Summary of Identified Public Revenue Generated by Forest Industry Activity in British Columbia

(Millions of Dollars)

	1969		1970	
	Provincial	Federal	Provincial	Federal
Taxes Paid by the Industry and its Employees				
Forest Service Receipts				
Stumpage and royalty	84.6	-	59.7	-
Other forest revenues	7.3	-	7.9	-
Forest Land, Timber, and Improvements Tax	36.1	-	40.0	-
Logging Tax	23.9	-	13.4	-
Income Tax				
- paid by firms	18.0	78.2	7.2	24.5
- paid by employees	19.9	76.6	23.0	87.1
Social Services Tax				
- paid by firms	14.0	-	14.0	-
- paid by individuals	10.5	-	10.5	-
Manufacturers Excise Tax	-	18.5	-	18.5
Gasoline, Motive Fuel and Fuel Oil Tax	2.3	1.1	2.7	1.3
Import Duties	-	6.3	-	6.3
Sub Total	216.6	180.7	178.4	137.7
Taxes Paid by Indirect Employees				
Personal Income Tax	29.1	113.5	31.0	119.7
Social Services Tax	17.4	-	17.4	-
Sub Total	46.5	113.5	48.4	119.7
Total	263.1	294.2	226.8	257.4

CHAPTER VI

FOREIGN TRADE IN BRITISH COLUMBIA FOREST PRODUCTS

Exports are a dominant factor in the economies of both the province of British Columbia and Canada. Forest products account for almost two-thirds of British Columbia exports and the province in turn accounts for almost half Canada's foreign trade in these products. Historically, lumber has been the principal British Columbia export with pulp and newsprint occupying the second and third places for at least the past 10 years.

The role of British Columbia forest exports in the Canadian total is shown in Table 1. Although lumber constitutes 47 per cent of British Columbia exports, in both Quebec and Ontario pulp and newsprint are the principal exports and lumber is far less important. In fact, 78 per cent of Canada's lumber exports come from British Columbia.

Table 1

Origin of Canadian Forest Product Exports
1971

	Million Dollars	Per Cent
British Columbia	1,379.0	45
Quebec	757.8	25
Ontario	489.3	16
Atlantic Provinces	353.5	11
Prairie Provinces	99.9	3
	3,079.5	100

Source: Bureau of Economics and Statistics, Victoria

Table 2 shows exports from the province in four selected years. Over the period covered, forest products gained in relative importance and in 1971 they represented 63 per cent of the total. Seven of the 20 leading commodity exports were forest products.

Table 2

Exports of Principal British Columbia Products

(Millions of Dollars)

	1971 Rank		1960	1965	1970	1971
*	1	Lumber	252.7	365.0	534.1	650.4
*	2	Pulp	99.0	181.0	356.1	386.3
*	3	Newsprint	100.6	133.8	181.0	186.2
	4	Copper Ores and Concentrates	9.3	31.1	121.8	126.2
	5	Aluminum ingots	58.5	55.7	85.5	111.1
	6	Fish Products	29.4	48.9	51.9	64.7
	7	Zinc Ores and Ingots	46.0	47.4	54.3	47.2
	8	Natural gas	10.2	22.6	41.4	45.8
	9	Molybdenum Concentrates	nil	11.3	60.0	43.8
*	10	Cedar Shingles and Shakes	20.6	29.1	32.5	43.3
	11	Chemical Fertilizers	30.1	29.2	35.7	35.0
*	12	Douglas Fir Plywood	10.9	29.0	39.5	33.6
	13	Coal	3.4	4.2	12.9	29.6
	14	Lead Ores and Ingots	20.0	42.3	41.7	28.4
*	15	Logs, Poles and Pulpwood	4.0	7.6	32.4	20.6
	16	Asbestos	8.9	13.9	16.3	19.9
	17	Iron Ore and Concentrates	9.6	19.7	17.1	16.9
*	18	Pulpwood Chips	5.3	6.8	7.7	14.2
	19	Crude Petroleum	nil	6.6	11.4	7.1
	20	Apples	6.8	8.3	7.0	6.5
		All Other Products	92.6	125.4	280.0	273.2
			817.9	1,218.9	2,020.3	2,190.0

* Forest product exports

Source: Bureau of Economics and Statistics, Victoria

The relative importance of individual forest products in the province's export trade is summarized in Table 3 below.

Table 3

Forest Product Exports Compared to Total British Columbia Exports 1971

	Value	Share Of	
	(Millions of Dollars)	B.C. Forest Exports (Per Cent)	B.C. Total Exports (Per Cent)
Lumber	650.4	47	30
Pulp	386.3	28	18
Newsprint	186.2	14	8
Plywood	33.9	2	2
Other Paper and Paperboard	33.3	2	2
Other Forest Products	88.9	6	4
Forest Exports	1,379.0	100	63
Non Forest Products	811.0		37
	2,190.0		100

Source: Bureau of Economics and Statistics, Victoria

Exports of British Columbia forest products by destination are presented in Table 4.

Table 4

British Columbia Forest Product Exports
By Destination
1971

(Millions of Dollars)

	United States	United Kingdom	Japan	E.E.C.	Other Countries	Total
Lumber	517.8	38.8	36.2	22.9	35.0	650.7
Pulp	148.7	35.5	53.5	109.5	39.1	386.3
Newsprint	141.9	1.6	2.6	1.1	39.1	186.2
Plywood	0.1	20.5	0.2	8.8	4.3	34.0
Other Paper & Paperboard	6.0	19.3	0.3	2.6	5.7	33.9
Other Forest Products	70.9	-	15.7	-	1.2	87.9
Total	885.4	115.7	108.5	145.0	124.4	1,379.0
	64%	8%	8%	11%	9%	100%

Note: Figures may not add due to rounding.

Source: Bureau of Economics and Statistics, Victoria

The distribution of British Columbia forest product exports shows the same general pattern and trends as Canadian exports as a whole. The United States is by far the largest single market, the United Kingdom is of declining importance, and the Japanese market is steadily expanding. In 1971 nearly two-thirds of British Columbia exports went to the United States. Lumber and newsprint exports were heavily concentrated in this market. Plywood was excluded from the United States and Japan, principally because of tariffs, and was exported mainly to the United Kingdom.

CHAPTER VII

RELATED USES OF FOREST LAND

Two key features of forest management in British Columbia are (1) that the Crown maintains ownership of forest land, and (2) that a tenure system has been developed which permits timber to be harvested from Crown land subject to Forest Service control. Development of the forest resource under this system has had a direct impact on public access to Crown land and on grazing. This chapter deals briefly with public use of forest access roads and with grazing on forest land.

A. Public Use of Resource Roads on Crown Land

The principal use of resource roads is for transport of forest products but there is a growing demand for the use of these roads for public access.

To obtain an estimate of the mileage of logging road potentially usable by tourists, the Forest Service prepared estimates of usable system logging road which are presented in Table 1. System road is a designation given to road that is constructed and maintained for the long-term management of the forest. It does not include spur and branch roads which are also frequently used by hunters and tourists.

Table 1

System Road Potentially Usable
By Tourists in British Columbia
By Forest District
1972

(Miles)

District	
Vancouver	11,900
Prince Rupert	2,300
Prince George	4,180
Cariboo	2,130
Kamloops	4,800
Nelson	4,860
	30,170

Source: B.C. Forest Service

The amount of system road potentially usable by the general public is about 30,000 miles. However, public access is restricted on some of this road due to active logging. In the Vancouver Forest District, for example, it is estimated that 80 per cent of 11,900 miles of system roads are restricted, mostly in the interests of safety. In addition, the value of some roads for recreation or other public use is negligible.

The historical pattern has been the opening up of areas by logging, followed in some cases by improvements of the logging roads so they could be used for access by the general public. If past trends continue, most system road will become more important for public access in the future rather than at the present time.

Attempts have been made elsewhere to measure the benefits of logging access roads to tourism and recreation. The results are usually less than precise. While it is clear that some of these benefits can be attributed directly to resource development, no careful analysis has been done so far in British Columbia.

However, it is still instructive to examine a map of the province which shows the location of resource industry communities and adjacent road systems. As a rule, the initial pioneering by industry has made one area after another available to the general public.

B. Control of Access Roads by the Forest Service

The Forest Service controls, on behalf of the Crown, the construction, maintenance, and use of logging roads required for the transport of forest products or for any other purpose.

Most logging roads construction on Crown forest land are built by timber licensees. The cost of road construction is one of the cost allowances permitted in the calculation of stumpage. Before a licensee or other authorized person can construct a road on Crown land he must obtain a permit. This permit may require, amongst other things, that the road be constructed on a specified route to a standard approved by the Forest Service. One objective of these requirements is to increase the current or subsequent value of roads for wider public access.

The Forest Service exercises control over access in two separate cases:

a) Roads classified as private:

> "Where, for the removal...of timber...any road is built on Crown lands by a licensee...the road shall be deemed to be the private property of the licensee ...during the currency of his licence or the duration of his authority." (Sec. 56:1 of the Forest Act)

b) Roads classified as Forest Service roads:

> "...the Minister may in his absolute discretion build roads and trails or acquire roads and trails for any purpose of administration under this Act, and may declare any road reverting to the Crown...as a Forest Service road." (Sec. 147:1)

A private forest road is subject to conditions the Forest Service may establish in the permit that grants the licensee private use of this road. For example, clauses may be appended to the permit which state that the right-of-way will be open for the use by the general public when actual industrial operations are not being conducted.

The Forest Act also contains the legislative authority to prevent the permit holder from obstructing use of the road by other persons:

> "When permission to use a road is unreasonably withheld by the owner, the person applying for the use of the road may appeal to the Minister, and the Minister may grant the right to use the road on such terms and conditions as he sees fit..." (Sec. 56:4)

Forest Service roads are normally free of restrictions on public use. If a conflict arises between industrial users over the use and maintenance of a Forest Service road, a permit may be issued that resolves the conflict.

The objectives of Forest Service control of access on both classes of road include protection of the public from accidents with logging vehicles, the licensee from disruption of logging, and the forest during periods of high fire hazard. In some cases companies with Tree Farm Licences have gone beyond Forest Service requirements by providing travellers with road maps, tourist information, and a list of recreation facilities.

C. Grazing on Forest Land

In British Columbia there are approximately 18.3 million acres of natural forage land potentially usable by domestic livestock. Of this total, 2.4 million acres are grassland and 15.9 million acres are forest range. All the grassland and about 10.6 million acres of forest range can be effectively used for grazing. The remaining 5.3 million acres of forest range is within parks, is too remote from livestock production facilities, or consists of scattered parcels too small to be economically usable. The Kamloops and Cariboo Forest Districts contain the majority of the grazeable forest land in the province. Nelson and Prince George Districts contain areas of only secondary importance.

Most ranches include both owned and leased land and involve a grazing permit for forest land authorizing the use of Crown range by a specified number of stock for a defined season. In terms of tenure, vested private land amounts to about 2.3 million acres, leased land administered by the Provincial Lands Service to about 0.6 million acres, and Crown range administered by the B.C. Forest Service to about 10 million acres.

Cattle are generally grazed on permit and leased areas at higher elevations during the summer months and on lower areas in spring and fall. In 1971, close to 170,000 stock were grazed under permit in British Columbia. About 80 per cent of the land involved is in the Cariboo and Kamloops Forest Districts. Crown forest range is frequently of key importance to the success of individual ranches. Without this range for summer grazing, the use of private range and cropland for livestock production on these ranches would not be economically feasible. Sheep grazing is of minor importance on forest land. Only 1,500 sheep were under grazing permit in 1971. With few exceptions, sheep are grazed on alpine meadows rather than on forest land.

The economic importance of forest land grazing can be viewed three ways: its importance to the cattle industry, to the regional economy, and as a source of public revenue.

From the viewpoint of the cattle industry, grazing on Crown forest land contributed directly about $12 million to industry revenue in 1971. This estimate is based on some 800,000 animal months of grazing on Crown range, a weighted selling price of 32 cents per pound based on cattle sales to B.C. Livestock Cooperative Association, and an average weight gain of 45 pounds per month. The extent of grazing on privately owned forest land is not known.

From the viewpoint of the regional economy, data is lacking to estimate the economic impact. An input-output study of Grant County, Oregon in 1968 revealed that county household incomes were increased by approximately $1.80 for a $1.00 increase in ranch household incomes. It was shown that incomes and employment in the agricultural and automotive service sectors of the county were most affected by changes in ranch incomes. The comparable figure for the lumber industry (logging, trucking of logs and final product, and sawmilling) was a $1.17 increase in county household incomes for a $1.00 increase in income to the local lumber industry. Again, automotive and agricultural services were the sectors most indirectly affected. Although it would be hazardous to apply these same multipliers to the ranching areas of British Columbia, they do suggest the order of magnitude of potential regional impact.

Finally, from the viewpoint of public revenue, direct revenues from permit grazing for the fiscal year 1970-71 were $449,000. Indirect revenues from sales, social services, and income taxes are not known. In 1971 direct revenues from grazing on Crown forest range amounted to about 4.5 cents per acre.

The use of forest land by both the cattle and logging industries has resulted in additional costs and benefits to each group. For instance, increases in logging costs have included the installation of cattle crossings and the location of roads to avoid irrigation ditches and prime grazing areas. Ranching costs have been increased by the need for additional fencing to keep cattle from straying away on logging roads and the disruption of grazing in the vicinity of active logging. Cooperation between the cattle and logging industries has benefitted both groups. Clear-cut logging tends to increase forage production and grazing on this forage tends to reduce fire hazard in immature stands. At the same time, the extension of logging roads into previously ungrazed areas has increased the acreage of accessible Crown range.

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